MONTHLY

JOURNAL OF AGRICULTURE.

VOL. III. MAY, 1848. NO. 11.

MARSHALL P. WILDER,

PRESIDENT OF THE MASSACHUSETTS HORTICULTURAL SOCIETY.

If there is any one class of citizens which deserves at the present moment especially the respect and admiration of their countrymen, it is, perhaps, the merchants of Boston.

To indomitable energy and enterprise, in acquiring wealth, they add a spirit of wisdom and philanthropy, and a faith in the progress of Man in the use of it, which at once does honor to the city in which they live, and raises the character of commercial pursuits more than all the honors of knighthood.

It would be making too long a catalogue were we to enumerate even the most conspicuous public benefits which Massachusetts has derived from this intelligent and high-minded class of her sons. Numberless public charities have been founded and supported: public and free schools planned and sustained; lectures given to the public; new worlds of thought opened to the blind; the deaf and dumb brought into correspondence with their fellow men; poor artists sent abroad to develop their Heaven-bestowed talents; colleges richly endowed, and a great Scientific School opened cheaply to every citizen of the Commonwealth for instruction in sciences applicable to all the useful industries of life.

This, and much more, has been done by a liberal application of the wealth produced by their own industry, by the merchants of Boston. It would be a pleasing task to designate those who have thus most successfully proved that they understand the true uses and true obligations of wealth. But we are obliged at this moment to confine ourselves to a single illustration of the benefits which a merchant, engrossed with business, may confer on his countrymen, when actuated by this large spirit of usefulness to his race.

Pearl-street, in Boston, completely rebuilt within a few years, presents to the eye two continuous lines of fine warehouses—beautifully and fittingly built, in an appropriate architectural style, of neatly-dressed granite. Enter with us one of these stores at the beginning of the street; ascend into spacious apartments where on every side are seen boxes and bales filled with the productions of the active looms of New-England; pass through counting-rooms where various clerks poring over huge ledgers tell of a widely extended business; and finally penetrate to a third office. In this inner vestibule of the house of trade, sits, before a desk covered with a large correspondence, a merchant thoroughly devoted to his calling. In his countenance you see only the engrossing cares of Commerce, and his ample

brow and clear, penetrating eye are full of plans for the increase of cotton-mills and American manufactured goods, of better quality, and lower price, than John Bull can possibly send into our market.

About four miles south of Boston is the town of Dorchester—one of those agreeable rural suburbs of Boston, which the sturdy city, now full of robust health, is fast overtaking and swallowing up with its vast commercial appetite. In a part of this town is situated a rural residence—well known as Hawthorn Grove. If we enter the gates of this simple and unpretending place, about sunrise or sunset, we shall find there not only grounds which are a complete museum of Horticulture, full of every known variety of fruit-tree; orchards well planted; and long, fruitful alleys: but, also, the same merchant we saw in the inner counting room in Pearl-street. The same? yes! the same to the common observer, doubtless; that is to say, the gentleman whose portrait illustrates this number of THE FARMERS' LIBRARY; but not now the busy, engrossed merchant—only the zealous, enthusiastic *Horticulturist*—the President of the Massachusetts Horticultural Society—the experienced pomologist—the importer of, and anxious seeker after all new fruits and plants; in short, MARSHALL P. WILDER—the subject of the present notice.

We are not about to write the life of Col. Wilder. We hope it may be many long years, filled, like the present, with usefulness, before he needs a biographer. It is our more agreeable task, at the present moment, to glance hastily upon the field of labors in which his name has become a public one, and in which it is especially interesting to the readers of this journal—as a horticulturist.

It is sufficient, then, to say that Col. Wilder is a native of New-Hampshire, the Granite State, which boasts, not without reason, that "*men* are the fairest product of her soil." He was born in the town of Rindge, N. H., in September, 1798, where his devotion to his garden and to mercantile life awakened along with each other. For more than twenty years he has been one of the most industrious and successful merchants of Boston, and for sixteen years he has employed every moment of *forced* leisure—leisure borrowed, not from business, but from the ordinary relaxations of the business man, in carrying out his favorite study of Horticulture.

In a city most conspicuous among all American cities for its horticultural amateurs, Col. Wilder has long been known as one of the most zealous and the most active devotees of this science. For eight years past he has been annually elected President of the Massachusetts Horticultural Society—first of all institutions of the kind in the Union for its large activity, intelligence, and usefulness. During his administration, the number of Members and the funds of the Society have been greatly increased, its new Hall erected, at a cost of $40,000, and a very richly illustrated series of its *Transactions* commenced.

But this is to us, and to the country at large, not the most important and valuable view of his great services as a scientific cultivator of the soil. There are, perhaps, many men's grounds more attractive, or more captivating to the novice, than those of the President of the Horticultural Society. But we think we may safely say that no garden in America, either public or private, has been more fruitful in good experiences for the benefit of the art generally, and especially of Pomology, than that of Hawthorn Grove.

Let us say a word or two to make this plainer to the general reader. Horticulture has been so much perfected in the last thirty years that it may be said

to be not only a science of considerable breadth, but an art involving in its materials ten thousand details. In all parts of Europe and America, new fruits, plants, and trees, are continually brought into existence by the creative hand of the skillful gardener. Especially at one period, about fifteen years ago, did the Flemish cultivators astonish the world of fruit-growers with their catalogues of superlative new fruits. Now the natural vanity of some, and the natural ignorance of other cultivators, lead them to overrate the merits of many new varieties. Difference of soil and climate also renders a fruit of the highest value in one country of lesser or greater value in another. Behold, then, how important that some steps should be taken by which all this vast mass of accumulated material should be put into the crucible of knowledge from time to time, so that the pure gold should be separated from the dross, for the benefit of a whole community of men who have good orchards and gardens!

In other countries, Societies or Governments, with abundant means at their command, have undertaken this Herculean task of collecting and proving new fruits and plants. But, in this country, no Society has as yet been able, no one of the States willing, to prosecute this interesting and necessary series of experiments. But what the Horticultural Society of London has done for England in the way of fruits, or the *Jardin des Plantes* for France, in trees and plants, Col. Wilder has to a very considerable extent done for New-England (and we may indeed say for the Union) in his own private grounds at Hawthorn Grove.

To accomplish this object he has long pursued the following plan:

1st. Entering into active correspondence and maintaining standing orders with all the most eminent horticultural amateurs and nurserymen of foreign countries, and procuring at the earliest moment every new production worthy of note, abroad as well as at home. This has necessarily given his grounds, at all times, the aspect of a crowded museum of gardening novelties from all parts of the world, more attractive to the understanding of the connaisseur than to the eye of the tyro.

2d. Continually testing these new fruits and plants by putting them in proper sites and soils, keeping an accurate record of all results, exhibiting all his specimens before the public at the exhibition of the Horticultural Society, and freely distributing scions, plants or seeds, to other persons.

3d. Producing new varieties by the scientific process of hybridizing*—several of which have been great acquisitions to the country.

As an experimental pomologist, we are inclined to give the subject of this notice higher praise than in any other department. He has that faculty of *just discrimination* so rare among *enthusiastic* collectors, which enables him to *reject and publicly excommunicate* a really inferior variety after thoroughly testing it; even if it should come to him with the highest reputation from abroad. "Take nothing on trust—prove for yourself, and hold fast to that which is good," such are the maxims which govern his experimental practice in his favorite art. We have indeed heard him remark to a friend, who expressed his surprise at his patience in collecting so many varieties of fruits, to find only so small a number really worthy of general cultivation, that such was his desire to get at the truth that "his satisfaction in ascertaining that a variety was poor (thus preventing its extensive dissemination) was nearly as great as in finding it worthy of general cultivation."

The *Pear* has perhaps been Col. Wilder's favorite fruit, and he has been re-

* A very able article on the curious and interesting subject of *Hybridization*, from the pen of Col. Wilder, will be found in the 2d Part of the "Transactions of the Massachusetts Horticultural Society."

markably successful in its cultivation. Even upon the Quince stock some of his trees have borne a barrel in a season. He has exhibited one hundred and sixty varieties of this fruit at a single Show of the Massachusetts Society, and his garden now contains more than *five hundred sorts* of pears from all parts of the world, either in bearing or under cultivation for proving their value for the American soil and climate.

Among exotic plants the *Camellia* was long ago his favorite. His collection at one time embraced nearly three hundred sorts, comprising every novelty extant. Applying, with his usual success, hybridization to this genus of plants, he has been successful in producing two new varieties of surpassing beauty—not excelled by the most perfect productions of Europe.

The Massachusetts Horticultural Society two years ago voted him a special prize of silver plate for those beautiful acquisitions to the domains of Flora.*

Col. Wilder's devotion to Horticulture, his liberality in imparting information, however dearly bought, and in distributing seeds, plants, and scions to parts of the country where their value would be appreciated, or whence some excellent native production was offered in exchange, have made him known as a benefactor to those who live "amid gardens and green fields" in all parts of the Union.

We may remark, in conclusion, that it would be difficult to present to the contemplation of our readers an instance of an individual who so completely accomplishes all the laborious duties of a life of large mercantile pursuits, and yet who at the same time makes his few hours of leisure, each day, tell so emphatically for his own happiness, and the benefit of his fellow cultivators of the soil, in all parts of the country. It is only indeed by making Horticulture the *great working pastime* of his life, that he has been able to accomplish so much. But can one hold up a better example to the emulation of those citizens who find nothing to do in the country, and no occupation there, worthy of engaging their energies and their industriously accumulated fortunes?

For ourselves, we rejoice in the long-sought opportunity and means of presenting to our young readers, and to gentlemen of opulence and leisure, even this brief sketch of what has been done by a single citizen, to investigate the merits and perfect the properties of our flowers and fruits; much as it falls short of giving a full idea of his contributions to an elegant and intellectual pursuit--one that at once denotes, accelerates and adorns in all countries, the progress of civilization. Nor can the full measure of honor due to such citizens as Col. Wilder and his associates, for the strong lead they have taken, as well in the science as in the practice of Horticulture, be properly estimated without making large allowance for the rigors of the climate with which they have had to contend. In more genial regions, Nature scatters profusely her beautiful creations, with open hand—without waiting for Art to assist, or Industry to serve her—while in the North, she yields them only, if not reluctantly, to the most skillful and assiduous importunities. But to these she does give them in such variety and richness, as none can appreciate who have not witnessed an exhibition of the Society over which Col. Wilder presides. Well do we remember when, on our first entrance into Hawthorn Grove,

"The perfumed air
Gave another sense, its prelude rich
Of what the eye should feast."

* These two Camellias were named by the Society, C. Wilderii and C. Mrs. Wilder. We may give our farming readers some idea of the commercial value of new and rare plants, by remarking that the stock of these two varieties was purchased of a nurseryman for $1,000, who immediately went to Europe, where, we learn, he disposed of them by subscription, at *ten guineas* the pair.

Since that time, always—and we may say habitually—holding in high comparative estimation the beauty and the usefulness of lives and labors thus devoted to peaceful and meliorating pursuits, we have been anxious, in a sense of duty, and for the good of Society, (least of all for his own sake) to pay to the proprietor the very inadequate homage which here we render.

For the painting from which the engraving has been made, we are indebted to the artist, Mr. Marchant of this City, in whose collection it still remains—a true presentment of the estimable original, as far as Art can supply one. The engraving, as will be seen, is by Mr. Jackman, and does him credit as a worker in that, one of the finest among the Fine Arts.

EXPERIMENTS IN CULTIVATION AND MANURES.

THICK AND THIN SOWING—DRILL AND BROADCAST HUSBANDRY—EFFECT OF CERTAIN MANURES—ALL COMPARED.

The English agricultural journals are throwing a vast flood of light on practical Agriculture, and we endeavor to give the brightest of it applicable to the United States. The fact is that the condition of English Agriculture is such as to compel the most skillful application of the greatest force both of talent and capital, that can be brought to bear upon it. Hence it invokes and commands the services of the ablest men in the Kingdom—men most versed in all the laws of Nature that apply to agricultural production. But these men, with equal judgment and good sense, all demand from the practical farmer a full knowledge of *reliable facts;* and to these they apply the principles of Science, and draw deductions on which the practical farmer may thenceforth rely and proceed. Such is the present state of Agriculture in Europe, and such the harmonious cooperation of Theory and Practice. Men in the field, making exact observations, and giving their facts; and men in the closet, reflecting on these facts the light of the torch of Science, and illustrating, to the apprehension of the plainest understanding, *how and why it must be so* and could not be otherwise—and by what means other and more propitious results may be obtained, where those have been heretofore unprofitable and disastrous to the hopes of the farmer. For example: the Farmer tells the man of Science—"On such a piece of land I had a heavy crop of roots, or grass, while on one very near, and richer, I had nothing worth cutting or storing." On inquiry, the man of Science finds that one piece of land drained itself, and retained no surplus moisture; while the other remained all the time more or less wet. Well, then he explains to the Farmer how water is a bad conductor of heat, while air is a good one; that if he will try he will find many degrees of difference in the temperature of the two pieces of land; and that if he will drain the wet piece, and draw off the particles of water that fill up the pores between the particles of earth, and let in *air* in place of them, it (the air) will at once convey manure to, or rather itself manure, the roots, and raise and improve the temperature of the land. The Farmer, however plain, can understand this. He drains the land according to the rules and with materials—*all* of which have been exhibited here in The Farmers' Library—and the next year he gets from his too moist land an additional crop that

more than pays all the expenses of the operation in one year, and leaves that very spot the most productive piece of land he has, in all time to come.

Such is what is being done for Agriculture by the harmonious "aid and comfort" that the scientific and the practical men are rendering to each other all over England and Scotland, under the spur of the most urgent necessity and by the force of immense capital; and, patrons of The Farmers' Library, the results of all this, which costs so much in England, and for detailed statements of some of which, in Prize Essays, hundreds of dollars are given—these results and these Essays we get by every steamer from England and France, and spread them all out before you for less than half a cent a page: one glass of poisonous alcohol, for which you pay 6¼ cents at the least, would pay for one of these Prize Essays, written by the first men living, in the various departments of Agricultural Science, machinery and mechanics, and paid for at the rate of from ten to sixty guineas—$50 to $300—under the award of the ablest and most practical men to be found in England. And yet there are those who would tell you that such knowledge is of no account, because, forsooth, there is, between England and some part of the United States, a *difference of climate!*—as if it took some privileged character, some wise man in his own conceit, to find that out.

Well, on this subject of climate, why do not Agricultural Societies offer premiums in the different States, to those who will keep and supply the most exact registers of meteorological observations—fall of rain and range of heat? Just because it would be going out of the common track—because they won't take the *trouble of thinking*, but content themselves with offering premiums for crops on perches of land, and great masses of fat on a frame of bones! Do not these Societies know the benefit which Agriculture might derive from a series of such observations in all the States? What are our Agricultural Committees of Legislative bodies about, that they don't take measures to secure such information for the use of the Farmer? Don't they know that the Government is spending hundreds of dollars to have such things done—exactly such—as connected with the Army—with War—those for which you, agriculturists, are taxed more than 80 per cent. of all you pay for the support of Government? Do you know that the People of the United States—the planters and farmers employed in the peaceful and civilizing pursuits of Agriculture—pay for our military establishments—Army and Navy—a *larger proportion* of the whole expenses of Government, than is paid for like purposes by any other people under the sun, unless it be, possibly, the serf-people of Russia, thousands of whom are bought, like cattle and sheep, along with the land! And for tame submission to such a vile prostitution of the ends of Government, and of taxes drawn from the products of your industry, do you not deserve the same fate? And, after all, until you dare complain, your Government will not, for agricultural uses, buy a thermometer, or set up a rain-gauge, or analyze a stalk of corn, or a pod of cotton, to save you from perdition, unless it were to see how far it might be made to take, cheaply, the place of *gunpowder!* Nor will your Representatives ever demand it to be done, as long as you have not the spirit to resist such iniquitous extortion. Eighty per cent. of all expenses for Army and Navy, ships and forts! It is impossible that a rational people can submit to it, situated as we are, unless it be that Almighty God, for some inscrutable purpose, has doomed them to be slaves—*Quem Deus vult perdere prius dementat.* Measures of Government provide for taking meteorological observations at all *military* posts, and on these the patriotic and philosophical inquirer must rely; but these are kept exclusively, as are such

posts, on the frontiers, and are necessarily deficient in supplying the information necessary for agricultural purposes and the general purposes of Science. Why should not the General Government, or, if not, the State Governments, pay to have such registers kept, at least at the Seat of Government in every State of the Union?

But to return to our subject: what follows may give some idea of what is doing in England, in the way of scientific information and practical experiment.—Thick or thin sowing is one of the engrossing topics, now, in foreign agricultural journals. We shall, once for all, give what follows. Our readers need not dread being overdosed, in this journal, about anything. When we see what seems to be new and useful, we shall give it, and be as soon as possible *done with that topic.* Every man of common sense can see (and we choose to anticipate the objection) that where so much is communicated there will be many things not exactly applicable to our country. But have we so poor an opinion of our readers as to suppose that they cannot discriminate as well as read?—What we should regard as strong *prima facie* evidence in favor of drill-sowing wheat is the persuasion that it is strongly advocated by such a farmer as Major JONES, of Delaware—a man who looks with his own eyes, and thinks with his own head, on all agricultural matters.

From the London Agricultural Gazette.

We are sure that our readers must agree with us in the high value to be placed upon the annual statements of his AGRICULTURAL EXPERIENCE which the Hon. and Rev. L. VERNON HARCOURT has published in our columns. Nothing can be truer than his first sentence in the adjoining page: "Facts, and not theories or opinions, are the things most wanted for the improvement of Agriculture." And nothing can exceed the faithfulness with which in the full details that follow he has adhered to this doctrine as the guide of his proceedings. Whether the subject be the merits and demerits of hedge-row timber—the relative advantages of sowing broadcast and in rows—the benefits of hoeing grain crops during their growth—or the much debated question of thick or thin seeding—it is not an opinion or a dogma that he insists upon, it is the simple record of his experience that he recites. How very few agricultural writers there are who, on most of the above-named subjects, would think it worth their while to refer to facts in proof of their teaching—they would assert the *self-evident* truth or argue from the *obvious* advantages, and so forth; but who would think of patiently observing and recording experience on points so "certain?" And yet this is the only true philosophy: to found a doctrine upon facts is the only safe method of teaching.

And if this be true of what are called "settled" questions, how much more of those which are still debatable! The question of THICK OR THIN SEEDING, for instance; we shall never arrive at any certain conclusion upon it so long as the disputants having stated all they *know*, prolong discussion on the character of their opponents rather than on that of their evidence. Some of these gentlemen exhibit a very suspicious preference of adjectives to substantives in their writings; this may be taken as a very safe indication of their approaching exhaustion. How easily and satisfactorily, on the other hand, the matter could be resolved if intelligent farmers—those who can give their own experience upon it—would simply state it, and thus conclude the discussion instead of leaving it in the hands of the few who have hitherto conducted it. Let Mr. Wilkins's experience, that of Mr. H. Davis, of Mr. Mechi, and of hundreds of others, be thus tabulated and compared, and we should have a sufficient basis of facts on which to rear a sound conclusion—but so long as farmers hear of three or four witnesses merely, and those asserting an experience acquired only on highly cultivated land, they will be justly fearful of sanctioning that general adoption of thin sowing which is recommended.

Our own opinion is simply this—that to grow a good crop of wheat many conditions must concur; *one* of these, and *not* the most important, being the right relationship between the number of plants on a given space and the means which that space (of air as well as land) has of maintaining them. There is a possibility of too few being grown as well as of too many; in the one case the greater size of the ears of corn does not compensate for this smaller number, and the whole plant later of ripening is more liable to disease; in the other, the number of ears does not compensate for their puny size, and the plants being crowded have short and weaker straw. There are, however, differences in grain produce, consequent on other causes, so great that we do not believe it to be much influenced by two or three pecks, more or less, of seed, between five and eight per acre: the former we believe, in ordinary circumstances, to be sufficient, and an additional quantity up to the latter is probably simply wasted, while beyond the latter it is probably

also injurious. All this may appear dogmatic, and to earnest advocates of thin seeding unreasonable; we can only say that for the last seven years we have sown from 60 to 120 acres of wheat per annum, with quantities varying from 27 lbs. of seed up to 10 pecks per acre, and our conclusions are, we think, rightly deducible from our experience.

There is no better illustration of the way in which this subject has been discussed than the reception experienced by "More Facts" in connection with it lately published in a tabular form by Mr. Baker, of Writtle, in the Mark-Lane Express. Two gentlemen noticed them on the following week. The one says: "I like Mr. Baker's quiet way of stating a fact; it is better than declamation;" and he very justly adds: "I hope, if he has any facts *in favor* of thin seeding, he will communicate them, and also the results of any of *his own experiments*, which I presume he has tried. I shall consider it my duty to publish all the facts I am cognizant of, either for or against, and I hope other agriculturists will do the same. We ought not to appear as mere *advocates* of a particular system, but as judges of facts sought for or tried by ourselves."

He then follows with a number of facts within his own knowledge as to the practice of farmers in his neighborhood, which we shall publish as so much clear addition to the history of the subject:

"Last year, Mr. Walker, of Petistree, Suffolk, a successful practical farmer, tried thin seeding, in consequence of my remarks at a previous meeting. In the middle of a fifteen-acre field he altered the drill-wheel, and deposited 1 bushel of seed on 1 acre, the rest of the field having his usual quantity, 2 bushels; it was sown in October. The thin-sown acre produced 7 bushels more per acre than the thicker sown acre, besides saving the bushel of seed. In another field, drilled in November, (a month later,) he had no increase from thin sowing, but saved his bushel of seed per acre, and grew a greater WEIGHT of straw, which confirms my own experiments, that we get more *weight* of straw from thin sowing than from thick. My own experiments for three years have been *invariably* in favor of 1 bushel per acre over 2 bushels—the saving being often the rent of the land. I have now 50 acres drilled with 1 bushel per acre, and 32 acres sown later with 5½ pecks. Mr. W. Hutley has, at Wigborough, 180 acres of wheat drilled with 5 pecks per acre. Mr. James Wood, of Goldhanger, grew as much from 1 bushel as from 2."

The other gentleman finds in Mr. Baker's "facts," arguments than which "nothing could have been more convincing in favor of thin sowing;" he adds no new facts himself, and welcomes these only because in *his* eyes they are in favor of what he considers a better system of Agriculture. Now, what we have all along contended for is that facts are welcome, whatever the tale they tell. What we want is TRUTH, not evidence in favor of any particular creed. We ough gladly to receive evidence of all sorts from trustworthy witnesses, and then we should admit its obvious testimony. But how does the correspondent of the Mark-Lane Express approach Mr. Baker's facts? By a singular and amusing ingenuity, he grounds his conclusions on a comparison of the best account of the thin seeding with the worst of the thick, and is silent regarding all the others on the scale between. It is as if, of all the fields on a farm, of various fertility, each of which was half thick sown and half thin, he had taken the characteristic acreable produce of the former from the worst, and that of the latter from the best of the series.

But he illustrates his point in another way. He shows by the plainest arithmetic that the produce of the thin sown was a greater multiple of its seed than that of the thick sown. This he appears to think is a great point. Now, so far from this, we submit that, excepting in a country where land is of no value, the inference he draws is absolutely worthless. It is the produce per *acre*, not per bushel of seed, that the farmer looks to. We have grown 30 bushels per acre from 1¼ pecks, and 50 bushels per acre from 8 pecks of seed; in the former case we obtained 80, and in the latter only 25 fold the seed, but on which had we the most reason for self-gratulation?

We subjoin the whole letter:

"As every additional fact in favor of a better system of Agriculture must be interesting to a thinking public, will you allow me publicly to thank Mr. Baker for his "More Facts on Thin Sowing," which you published in your Express of December 31. An article so much in favor of thin sowing from the captain of the influential troop of agricultural protectionists must have great weight with the agriculturists of Essex, and perhaps so with all England. Mr. Baker's facts are as follows:

5 pecks sown produced 3 bushels and 3½ pecks.
7 pecks sown produced 5 bushels and 2 pecks.
5 pecks sown produced 7 bushels. And
8 pecks produced 9 bushels and 2 pecks.

That is to say—

5 pecks produced 15½ pecks, or 1 peck produced 3 1-10 fold.
7 pecks produced 22 pecks, or 1 peck produced 3 1-7 fold.
5 pecks produced 28 pecks, or 1 peck produced 5 3-5 fold.
8 pecks produced 38 pecks, or 1 peck produced 4 6-8 fold.

"By the above analysis it is clearly shown that the experiments do furnish more facts on thin sowing, since one of the smallest quantities of seed produced the largest increase of crop; the 5 pecks produced 28 pecks, while 7 pecks produced only 22 pecks. Nothing, therefore, could have been more convincing in favor of thin sowing, or I would show Mr. Baker where by a little more than half 5 pecks of seed 75-fold was produced, and where only a little more than 5 pecks of seed produced a crop of nearly 68 bushels an acre. But the above 'More Facts on Thin Sowing' are enough, and I thank Mr. Baker for publishing them."

We have not given the names of the writers of these letters (we cannot suppose that

they will care for that) because our object has not been to bring home anything to *them*, but simply to illustrate the general subject of agricultural instruction, of which Mr. Harcourt's paper following is so valuable a specimen.

EXPERIMENTS IN CULTIVATION AND MANURES.

Facts, and not theories or opinions, are the things most wanted now for the improvement of Agriculture. The latter are as plentiful as blackberries, the former are treated as if they were weeds not worth producing, and yet they contain the whole practical truth of the art, and the latter cannot be sound if they are constantly contradicted by them. I therefore persist in recording the results of my experiments as a contribution toward laying the foundation of more certain knowledge, and it is the more necessary because Agriculture is not an exact science, but is exposed to a thousand contingencies which perplex our investigations; and accidents of weather and variations of soil and the ravages of animals render accurate comparison extremely difficult. The object of these experiments in cultivation was to compare—1. Sowing broadcast with sowing by the drill. 2. Thin sowing with thick sowing. 3. Hoed crops with unhoed crops. The first experiment was made in five different places; but one of them, on account of the havoc committed by the wire-worm, was not a fair trial; of the remainder, two gave the following results, the calculation per acre being made from 6 perches measured and weighed:

	Corn per acre.		Straw per acre.		Weight per bush.
	Bushels.	Gallons.	Trusses.	Pounds.	Pounds.
1. Drilled wheat	36	5	87	14	60
Broadcast ditto	43	2	102	8	61
2. Drilled wheat	40	0	81	17	62
Broadcast ditto	41	5	89	22	62

The last of these I consider a perfectly fair trial; and the advantage is on the side of the broadcast, but it is an advantage which I hold to be more than compensated in favor of the drill by the superior economy and execution in keeping the land clean; with respect to the other I must observe that a better quality as well as a larger produce argues that inequality of soil to which I have already referred; a crowded crop may increase the quantity at the expense of the quality; but when there is not only more straw and more grain, but more weight per bushel too, that must be ascribed to something more than the difference in sowing; moreover, the broadcast was sown thicker—7 pecks instead of 6. But the same remark applies still more strongly to the third instance, where, though in the same field, and that, too, not a large one, the crop will be seen to be so much inferior:

	Corn per acre.		Straw per acre.		Weight per bush.
	Bushels.	Gallons.	Trusses.	Pounds.	Pounds.
3. Drilled wheat	20	0	45	33	59
Broadcast ditto	33	3	75	20	60½

It is obvious that there must be a great deterioration in the quantity of the soil in this part of the field, and to a greater extent where it was drilled than where it was broadcast,* for though it was so thin upon the ground, the bushel weighed 1½ lbs. less. The fourth example shows the advantage decidedly in favor of the drill, which is not counterbalanced by any similar objection.

	Corn per acre.		Straw per acre.		Weight per bush.
	Bushels.	Gallons.	Trusses.	Pounds.	Pounds.
4. Drilled wheat	40	0	77	1	62
Broadcast ditto	33	3	66	24	62

In the next place, the evidence of the experiments is very much against thin sowing. It might easily be imagined that since in some seasons and in some localities severe injury is inflicted upon wheat by a variety of minute animals, the crops which have no plants to spare must suffer much more in proportion than those which can afford to lose a great many, and yet retain enough to cover the ground. It would seem unnecessary to insist upon so plain a proposition, were it not that some persons most resolutely shut their eyes against the most obvious truths; for this reason only I will mention a fact which otherwise would not be worth recording. In a field where the wire-worm had been very destructive, 7 pecks of corn sown produced 20 bushels; but where 4 pecks only were sown the quantity was reduced to 13 bushels; and in another, where 8 pecks had been sown the produce was 33 bushels; but where half that quantity was sown the produce was less than half, or 16 bushels; but it was not only under circumstances of disadvantage that thin sowing failed of success; its inferiority was shown, though not in the same degree, when the crop was good, as shown in the following cases:

* I have since examined these soils, and find that in the part of the field where the last experiment was tried there was 5 per cent. less of alumina 12 per cent. less of sand, and 11 per cent. more of lime and magnesia than in the other.

	Corn per acre.		Straw per acre.		Weight of Corn.
	Bushels.	Gallons.	Trusses.	Pounds.	Pounds.
Wheat dibbled, 4 pecks	27	4	57	1	62
.. drilled, 8 pecks	40	0	77	1	61½
.. dibbled, 3½ pecks	40	0	106	24	60
.. broadcast, 7 pecks	43	2	102	8	61

However, it may be said in this case that the greater weight of the grain, and the greater quantity of corn, from a smaller amount of straw, indicate some accidental superiority of soil; and it proves that in some particular instances good crops may be obtained from a very small amount of seed. The third series of experiments tend to show the advantage of hoeing wheat, though that advantage in the first two cases is limited to a small increase of straw, the measure and weight of grain being just the same under either treatment. The dibbled, both hoed and unhoed, yielded 29 bushels 7 gallons; the drilled, both hoed and unhoed, 43 bushels 2 gallons; but the hoed from 1 to 2 trusses more. In another field the comparison stood thus:

	Grain per acre.		Straw per acre.		Weight of corn.
	Bushels.	Gallons.	Trusses.	Pounds.	Pounds.
Wheat drilled and hoed	35	0	56	26	61
.. drilled but not hoed	33	3	62	34	61
Austrian wheat dibbled but not hoed	43	2	108	8	61
.. .. dibbled and hoed	46	5	128	18	61

Here the advantage of hoeing is very decisive; and I shall have occasion to revert to this subject by-and-by. In the meantime I must observe that though more than 46 bushels of corn can be obtained, as in this instance, from little more than 3 pecks of seed, it does not warrant the general adoption of the practice, for in most cases it would be attended by disappointment; failure is the rule, success is the exception. With respect to the value of manures applied as a top-dressing to meadow land, I continue to find sulphate of ammonia, when applied at the proper season, to be uniformly beneficial and remunerative, though sometimes only to a small extent. In two instances, where ¾ cwt. was employed, the increased value of the hay after deducting the price of the manure, was 1s. 4d. and 7s.; in other trials, where the quantity was 1 cwt., the profits per acre were 3s., 12s. 2d., 14s. 1d. The only instance of loss was where it was sown merely for the sake of the experiment, too late and after the dry weather had set in. But even that may not be ultimately a total loss; for I found upon comparing two portions of land, neither of which had been manured this year, but one had last year received a dressing of the sulphate of ammonia, and the other none—the value of the hay on the former was 3s. 10d. per acre more than on the latter. A similar experiment, when the manure had been guano, gave an increase in one trial of 3s. 9d.; in another none at all. The application of the same manure this year was rather more successful than before; for it failed once, but succeeded twice. The loss was 4s. 4d.; the gains were 3s. 3d. and 7s. 2d. The quantity in the last instance was 2 cwts.; in the others 1½ cwts. But on poor soils the benefit of applying artificial manures to the trefoils was more remarkable. The manures were selected in this case with a special view to the constitution of the plant, and these were the results:

	Weight of hay.			Cost per acre.			Profit.		
	Tons.	Cwts.	Lbs.	£	s.	d.	£	s.	d.
Yellow trefoil, without manure	1	0	106						
1¼ cwts. guano and 1¼ cwts. gypsum	1	6	74	0	15	0	0	7	10
1¼ cwts. guano and 1¼ gyp. 40 bus. ashes	1	11	48	1	10	0	0	11	10
Red clover without manure	1	6	74						
2 cwts. superphosphate of lime	1	12	39	0	14	0	0	8	9
Do. and 40 bushels of ashes	2	0	53	1	9	0	1	6	3
1½ cwts. clover manure	1	13	37	1	1	0	0	5	8
Do. and 40 bushels of ashes	2	9	58	1	16	0	2	15	4

Here it will be observed that the ashes in each instance greatly augmented the fertilizing power of the manures to which they were added; and yet, when used alone, they did not repay their cost by 1s. 8d.; but it follows not from this that separately they have less efficacy in proportion than they have in combination with other substances. General experience shows that they are very favorable to the growth of trefoil; and in this case there is no second trial to check and correct the first. I now pass on to other experiments, embracing both the effects of cultivation and the action of manure, experiments which have been continued for four years on the growth of wheat upon the same ground with the same artificial manures and no other. Two things, however, must be premised: 1. That in the course of the preceding summer, the ground being overrun with the *Convolvulus arvensis*, in order at once to get rid of the weed and to restore to the soil the inorganic food which has thus been abstracted from it, the roots were collected and burned; care, however, being taken to burn on each plot of ground only

those plants which had grown upon it. 2. In the renewed trial, whether artificial manures might not equalize the productiveness of good and bad grain, the latter being left without any artificial aid for five months, more than half of it either did not grow or was destroyed in the winter, and it was necessary to take up the whole of the remaining plants and divide them. Being then replanted they scarcely covered the ground, and stood at such distances from each other as would have satisfied the stoutest advocate for thin sowing. As soon as they had taken root again they were watered with the solutions, and through the summer they were remarkable for the dark-green, vigorous appearance of the foliage; but the straw was shorter than the rest, and was later in ripening by a week or ten days. The results of this treatment and the produce of this year compared with that of the last are shown in the subjoined Tables:

Names of Manures.	1846.				1847.			
	Weight of corn.		Weight of straw.		Weight of corn.		Weight of straw.	
	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.
Good Seed.								
Phosphate of potash, 4 lbs....	12	12	26	15	14	4	35	0
Phosphate of potash, 2 lbs.. } Sulphate ammonia, 2 lbs .. }	13	10	24	2	17	11	40	0
Sulphate ammonia, 4 lbs.....	13	6	24	2	17	13	35	0
No manure.....	13	8	23	14	14	8	33	0
Bad Seed.								
Phosphate potash, 4 lbs.....	10	14	23	6	12	2	28	0
Phosphate potash, 2 lbs.... } Sulphate ammonia, 2 lbs.. }	17	8	30	14	18	13	31	0
Sulphate ammonia, 4 lbs.....	16	10	24	6	15	9	30	8
No manure.....	11	10	22	14	12	13	25	0

Here three facts call for remark: 1. In every instance the phosphate of potash seems to have caused a greater production of straw and less of corn; and in one case the sulphate of ammonia had the same effect, but the same weight of manure, consisting of the two combined, produced a very considerable increase of both. 2. Instead of a diminution resulting from a repetition of the same crop, we see in every instance but one a great increase this year of both, even on those parts which received no addition of foreign manure, and the single exception is more apparent than real; for the great increase of straw shows that the falling off was due to some accidental cause. The seasons, which are beyond our control, sometimes produce effects of which we can render no account; but a part, at least, of the increase may be ascribed to the inorganic elements, which were slowly elaborated from the soil in the summer by the weeds being restored to the roots of the corn in a more soluble and therefore in a more available state in the shape of ashes. 3. Though the bad seed did not yield more than the good, as it did last year, yet in proportion to the quantity of straw the produce of corn was greater, and therefore the difference must be ascribed to the thinness of the plant upon the ground; and, farther, not only was the whole amount of corn from the bad seed this year greater than the whole amount from the good seed last year, but in one instance it surpassed the good this year too, and surpassed it not only in quantity but in quality, for the value is tested not by measure but by weight. Much of this success must no doubt be attributed to the complete consolidation of the soil, by the trampling of the transplanters, and the application of the manure to the plants exactly at the critical period of their growth when they were best able to appropriate to their organization the food with which they were supplied. The next chemical manures tried upon a somewhat smaller space of ground were the same as before—sulphate of soda, phosphate of soda, muriate of ammonia, and nitrate of potash. All the seeds were first steeped in a solution of these salts, and half of them in the following spring watered with 6 lbs. of them. For the purpose of comparison the produce is given both of last year and this:

Names of Manures.	1846.				1847.			
	Weight of corn.		Weight of straw.		Weight of corn.		Weight of straw.	
	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.
Sulphate of soda watered....	31	2	52	13	35	6	92	0
.. steeped only	29	0	50	2	31	14	77	8
Phosphate of soda watered ..	29	14	46	2	31	0	74	12
.. steeped only	30	12	52	14	32	0	84	12
Muriate of ammonia watered.	34	2	63	0	36	14	109	4
.. steeped only	28	8	52	14	30	10	89	4
Nitrate of potash watered....	30	6	62	14	31	0	90	4
.. steeped only	29	12	62	1	27	13	83	0

The same remarks apply to these as to the former experiments, except that the phosphate of soda seems to be more injurious than the phosphate of potash, since the wheat watered with the solution produced in both years, not only less grain but less straw, too, than where the seed was only steeped. But with the single exception of that which was

steeped in the nitrate of potash, the produce of all this year exceeded that of last year; and even that may be more an apparent than a real exception; for the quantity of straw was nearly one-third more. It only remains to mention that every alternate row having been left unhoed, the produce of those rows was less by 27 lbs. 4 oz. than from those which had been hoed; and the oftener that operation was performed the greater was the increase. But it is necessary to be cautious; for though it is useful to keep the soil open till the lateral fibres of the roots have penetrated it, yet afterward the hoe is mischievous, for it cuts off the mouths by which the plant feeds itself.

Before I conclude, the obvious improvement obtained in these experiments from so small an amount of inorganic manure, leads me to notice a vulgar error which a certain agricultural fanaticism is propagating too successfully all over the country. If any agricultural radical boasts that he has slain his thousands of trees, and claims merit for it as a great benefactor to mankind, he not only shows an utter insensibility to all the beauties of Nature, and a utilitarian dullness destitute of taste, but also a woeful ignorance as to some plain matters of fact. I do not contend that trees do no harm to crops; I freely admit that inclosures may be too small, and trees too numerous; but I do contend that to proscribe them altogether, and to banish them entirely from any extensive farm, is the greatest blunder that can be committed by an agriculturist. Ask the traveler whose eye is wearied by the endless tracts of open lands in France what it is that strikes him most when he crosses the Channel, and he will tell you that it is the richness of the scenery formed by the inclosures; and this is no illusion; it is not a mere impression upon the eye from the intermixture of trees in the landscape; it is a real richness of soil, a real difference of verdure and vegetation produced partly by shelter and partly by the fertilizing operations of Nature. When Mr. Jacob published his account of Agriculture on the Continent, he stated that the return of wheat in the North of France was eight or nine for one. In the inclosed parts of England no good farmer would be content with such a return, though in the most bleak and exposed situations it would not be far from the mark; and why? Because protection from wind is an essential condition of fertility. In a dry soil, especially, the unrestrained action of wind abstracts from the growing plant more moisture than its roots can supply, and therefore tends to weaken and to wither it; and the same effect is produced by the great reduction of temperature which it causes; for it is well known that rapid evaporation is the source of intense cold. But crops want protection from wind in their state of maturity as well as in their state of growth. Wheat and oats sometimes suffer much from the absence of it, and for one bushel that is lost by the neighborhood of trees, ten will sometimes be scattered on the ground by the shaking of the wind.

But farther, though shade is injurious to crops, yet both shade and shelter are wanted for cattle. If they are to be kept in the highest state of health, shade in summer and shelter in winter. Let any one observe what a longing for shade is exhibited by animals in a hot day; how sheep, for instance, cluster under the shadow of a tree, or a hedge, or even a bank, and then say whether, by depriving them of that comfort, you do not subject them to a privation likely to be injurious to their health, or at least very hostile to their thriving well. In winter, again, the want of shelter is admitted on all hands to be hurtful to them, on account of the great combustion of food in the lungs which it occasions, and the great loss of animal heat; and therefore some of those who have deprived them of that which Nature gave them have been driven to invent movable sheds to supply its place. The exterminators of trees, indeed, go so far as to say that all animals should be kept under cover. Be it so; if they can find their system answer to them, let them manure their fields with gold if they will; it is not for me to complain of it. What I do complain of is their propagandism, that they beguile those who have not, and those who cannot have their accommodation, into a belief that, by a partial adoption of their system, but omitting the most material part, they are acting well and wisely. It may be said that animals resorting to hedges and trees for shade and shelter, deposit their manure in places where it must be lost. But why must it be lost? Did anybody ever hear that manure is lost when it is deposited in the fold-yard? And why may it not be collected in one place as well as in another, especially since there is the same intermixture of animal and vegetable matters? for where the droppings fall the leaves fall also. It may be said that they are scattered by the wind over the surface of the ground; well, but if they are scattered, they are not annihilated, and wherever they are deposited their decomposition adds so much useful matter to the soil, and before decomposition they protect the young crop from frost, and prevent the radiation of heat from the earth. Strange it is that when the value of leaves and leaf-mould is so well understood by gardeners, it should be so entirely overlooked by farmers; but since many persons are extremely slow either to perceive or admit inferences from analogy, I determined to bring this question to an issue in a method almost approaching to demonstration.

I had the leaves of a tree which stood apart from all others collected and weighed when they were so far dried by exposure to the air as to be fairly considered dry leaves; their weight was 360 lbs., the space of ground covered by the tree was from 8 to 9 perches, and beyond that area no effect at all from the roots was perceptible. Here, then is more than 3 cwts. of manure to compensate for any

loss sustained from the tree; the next thing was to ascertain what that loss might be on arable land. The mean of three trials upon wheat under the shade of trees, compared with equal spaces in the middle of the field, was for 9 perches a diminution of grain to the amount of 1 bushel and 1 gallon; supposing, however, that it might amount to 2 bushels, which is almost double the result of actual experiment, it would be far more than replaced by 3 cwts. of leaf manure; but in order to bring the proof within a narrower compass of known facts, I farther ascertained that by reducing the leaves to ashes there would remain about 34 lbs. of inorganic manure; now, since the few pounds produced by burning the roots caused an increase of 26 lbs. of grain upon 32 perches, which is 1-5th of an acre, five times that amount will give 130 lbs. per acre, which is more than the weight of 2 bushels of the best wheat. But here the quantity of manure is not strictly determined; in the foregoing experiments the quantities are known, but only the phosphates and the sulphate of soda will serve for comparison, as being wholly inorganic; but the former salts depend so entirely upon combination for the activity which they then possess, that they cannot form the basis of any fair calculation, although both the acid and the bases are found in leaves upon analysis; the sulphate of soda, therefore, alone remains, and even this is very disadvantageous for the purpose, because 17 times more potash, of which the leaves principally consist, are required for a crop of wheat than of soda. Nevertheless it appears that the application of 12 ounces of this inorganic manure increased the crop by 3½ lbs.; taking it, however, at only 3 lbs., and multiplying it by 45, which is in round numbers the amount of equal doses contained in 34 lbs., the increase would be in return for the leaves 135 lbs. of corn, which again is more than the weight of the 2 bushels supposed to have been lost by the tree. If any one should object that trees only restore to the soil the food of which it had previously deprived it, the objection is quite erroneous, for the plow takes care to cut off all the roots near the surface, and the subsoil only is concerned, and the rest penetrate to a depth which the roots of the crop cannot reach, and there elaborate fresh materials of fertility, and bring up again the soluble manure which had filtered through the soil, or been carried down by the rains. It has now been proved, therefore, that the injury inflicted by trees, though more immediate and obvious to the eye than the benefits they confer, is amply compensated in the ultimate results, and that we are not justified in deforming the country in order to increase its food. I am quite sensible that the preservation of these leafy screens may be carried too far; the best things become bad in excess. It is good for the soil to be warm, it is not good that it should be parched; it is good that it should be moist, it is not good that it should be deluged; it is good to have the benefit of the sun, it is not good to have no shade; it is good to have a free circulation of air, it is not good to be exposed to violent winds. I cannot, therefore, understand how those who at great expense scruple not to cover acres of ground, which might bear wheat, with fold-yards and cattle-sheds, because they economize manure and food, and favor the health of the animals, can proscribe, as an intolerable usurpation, provided they are kept within moderate bounds, those natural manufacturers of manure and shelterers from the storm which cost them nothing, and pay well for any apparent damage, and are a refreshment to the eye and an ornament to the landscape, and a source of fuel for the poor, and a supply of timber for the use of the farm.

L. VERNON HARCOURT,
West Dean House.

THE ENGLISH CORN LAWS.

It much concerns the American farmer and planter to know what is likely to be the effect upon British mind and British interest of the Free Trade policy, so called, under which their Corn Laws were suspended, to let in our grain free. For his agency in the agitation of the Free Trade question, on the affirmative side, it will be recollected that its advocates presented Mr. Cobden with the snug little purse of three-quarters of a million of dollars. We should like to see some Member of Congress, or any other man of power, entitle himself to a like donation from American cultivators of the soil, for diverting to the promotion of agricultural knowledge and improvements, one-fourth of the sum now levied on them, indirectly, for the worse than useless purposes of war.

A writer in a late number of the Mark-Lane Express, thus speaks of the *effect* of Free Trade. If those in power should be brought by experience to his

opinions, we may judge how long it is likely to be before all that will be changed —all will be reversed.

THE EFFECTS OF FREE TRADE.—*Sir:* We have now had more than a year's trial of Free Trade, and let us see what are the great blessings it has entailed on this country. We were told by the advocates for the repeal of these laws, that it would be the means of increasing the demand for our manufactured goods, and the manufacturing and commercial interests of this country would flourish beyond any former period of history. Now how stands the case? Have we not had failures among that body to an extent frightful to contemplate, ay, nearly twenty millions in amount? Men of hitherto high standing as princely merchants, after paying from 10 to 20 and even 30 per cent. to uphold their fast-sinking credit, have been compelled to yield to the pressure of the times, and have fast followed each other in the general crash, till I believe not less than twenty millions in amount of failures have been declared.

I have no doubt that the advocates of Free Trade will say that Free Trade has had nothing to do with our present panic and pressure for money; but I think that a careful perusal of the following statement of the amount required to pay for corn and provisions imported in nine months, ending October 10, 1847, as compared with the amount required for the same period in 1845, will throw some light on the subject:

IMPORTS INTO THE UNITED KINGDOM FOR NINE MONTHS, ENDING OCTOBER 10, 1845 AND 1847.

	In 1845.			In 1847.		
		Price.	Value.		Price.	Value.
		£ s. d.	£		£ s. d.	£
Cattle	11,490	12 0 0	137,880	50,264	12 0 0	603,168
Calves	1,543	2 10 0	3,857	20,313	2 10 0	50,776
Sheep	6,918	1 0 0	6,918	98,020	1 0 0	90,020
Lambs	112	1 0 0	112	3,015	1 0 0	3,015
Hogs	530	2 0 0	1,060	743	2 0 0	1,486
	Cwts.			Cwts.		
Bacon	4,540	2 6 6	10,055	72,995	2 6 6	169,713
Beef	72,066	2 6 6	167,503	99,000	2 6 0	230,150
Butter	189,056	5 0 0	945,280	243,144	5 0 0	1,215,520
Cheese	183,891	2 16 0	514,899	243,601	1 16 0	582,082
	Qrs.			Qrs.		
Wheat	368,442	2 10 0	921,105	1,977,474	3 17 0	7,613,274
Barley	302,826	1 12 0	484,522	710,824	2 9 0	1,777,060
Oats	449,961	1 2 0	497,958	1,454,755	1 12 6	2,363,976
Rye	304	1 10 0	456	61,861	2 16 0	171,210
Maize	47,913	1 10 0	71,869	3,240,588	2 10 0	8,101,470
	Cwts.			Cwts.		
Flour	392,151	0 14 0	274,516	5,774,675	1 2 0	6,352,142
Barley-meal				10,950	0 10 0	5,497
Oatmeal	2,756	0 8 6	1,171	52,044	0 10 0	26,022
Rye-meal				727,287	0 13 0	472,736
Indian-meal				1,335,464	0 13 0	868,001
Hams	4,543	2 16 0	12,720	17,331	2 16 0	48,526
Pork	32,713	2 6 6	76,057	212,544	2 6 6	504,455
Rice	392,205	0 15 0	294,153	1,046,083	0 18 0	991,470
Total			4,410,091			31,241,766

In calculating the prices for each article, I have done so at the nearest average price for each year I can obtain. I have not varied the price for live cattle and dead meat, butter or cheese, as the average price of these articles for both years was so nearly alike; and by this statement it appears that the money required to pay for these articles of Imports in nine months, ending October 10, 1845, was only £4,410,091, but that in the same period of time, ending October 10, 1847, the money value of the same articles imported was £31,241,769. We thus prove that £26,831,678 more money was required to be sent out of this country to foreigners, to pay for these articles; and I find that the declared value of British and Irish produce and manufactures exported in nine months, ending October 10, was as follows:

1845.	1846.	1847.
£41,732,148	£40,008,874	£39,975,207

So that we find that under Free Trade we have diminished exports in nine months, in 1847, as compared with same period for 1845, of £1,766,941, and therefore the balance of trade has been against this country to an extent of £28,598,619. I am foolish enough to imagine that twenty-eight and a half millions of cash being sent abroad to balance this account have caused the derangement in our money matters, and that we must not attribute it to the expenditure of our capital in the payment of labor, &c., for the formation of our railroads.

I remain your obedient servant,

Ickleton, November 29. SAMUEL JONAS.

Let the reader multiply pounds by 5 to get the dollars.

It would be worse than idle to say that we are not deeply interested in the legislative measures of a country to which we exported

In 1847.	Flour.....3,150,689 barrels.	In 1847.	Wheat..... 4,015,134 bushels.
..	Corn-meal..... 847,280 ..	..	Indian corn.....17,298,714 ..

besides rye, oats, and barley.

Would it not be well for the steady prosperity of the American farmer, if he could establish some permanent policy, that would invite and bring over the manufacturing capital, skill, and machinery, that gives employment abroad to the men that consume all these provisions? Were they settled down, with their lap-stones, and their looms, close alongside of him, they would bring the cotton on the spot, where it is made, and the corn and wheat where they are grown, and the millions of waste lands in our old States would be yielding their millions of bushels of apples and potatoes, and turnips, and tons of hay and cheese, and the time, and manure, and money, that are now wasted on the road, and in the work of exchange, would be saved to be applied to the improvement of the waste lands: at least it seems so, and *is* so in Massachusetts and Rhode Island, whose population is increasing, lands rising, and education extending more and more.

THE FRUIT-BEARING POWERS OF THE GRAPE-VINE.

INCREASING consumption and improved culture of fruits may be considered sure signs of improving morals and civilization. The cultivation of the *Vine* and the melioration of the Grape have made much progress within the last twenty years, in and around some of our large cities, but the wonder, if not the disgrace, is that they still command so little attention, and are so little understood and enjoyed in what we denominate the *country*. The mass of the country people have no conception of the size and perfection of grapes to be seen in the shops of Boston, New-York, and Philadelphia.

The most extensive and perfect vineries that we have ever seen are those of Col. PERKINS, of Boston, Mr. COLT, of Paterson, N. J., and those of that late most accomplished gentleman, N. BIDDLE, at Andalusia. But theirs are not establishments to be imitated by the masses. The Catawba and the Isabella, native grapes, adapted to open culture, are as good as anybody need desire, and these might easily be had by every man who has a few feet of ground and the gable-end of a house or a trellis for them to run on. To any farmer who has not, after being four or five years in the management of a "place," it ought to be as much a matter of reproach and scandal as it should be to his wife to be seen with holes in the heels of her stockings.

Even the country grapes, if properly cultivated, might, many of them, doubtless, be improved to be very good table grapes. But so utterly unread and uninformed are the young people in the country in things that particularly relate to the occupations and resources of their condition, that they grow up in utter ignorance of useful and even elegant branches of knowledge, that might be acquired by a few hours of attention, and that would greatly add to their comforts all the days of their life. Take this very case of *vine culture:* the vulgar notion is that the cultivation of a native grape would consist in manuring and hoeing around it and leaving it, for all the rest, under the influence of its natural growth and instincts; and this would be very well if, instead of an enlarged and meliorated berry filled with delicious juice, and void of seed and pulp, the ob-

ject were nothing but luxuriant and wide-spread growth of wood and leaves. Instead of this, every boy might learn, in some small treatise, highly proper for a *country* school-book, that the cultivator of the vine must or ought to study its *fruit-bearing* powers, the manner of propagating, by cuttings and by layers, and of pruning—the best aspect, soil and manure, &c.

In England, one of the most popular writers and practical *vignerons* has made a series of experiments based on the principle of proportioning the quantity of bearing-wood, retained at the autumn pruning, to the capability of the vine to *mature* its fruit. The results of the experiments were carefully noted from year to year, and the principle established was that the capability of the vines was in direct proportion to the circumference of their respective stems. On the basis of all these observations, Hoare, in his Treatise on the Grape-Vine, lays down the following

SCALE of the greatest quantity of grapes which any vine can perfectly mature in proportion to the circumference of its stem, measured just above the ground.

Circumference.	*Pounds.*	*Circumference.*	*Pounds.*	*Circumference.*	*Pounds.*
3 inches	5	5½ inches	30	8 inches	55
3½ "	10	6 "	35	8½ "	60
4 "	15	6½ "	40	9 "	65
4½ "	20	7 "	45	9½ "	70
5 "	25	7½ "	50	10 "	75

The author says he had no opportunity of testing the rule on vines larger than ten inches in circumference; and, finally, he adds that with respect to the number of buds that are necessary to be left at the autumnal pruning to produce any given weight of fruit, he has found it to be a good general rule, applicable to all those kinds of grapes usually cultivated on an open wall, to consider every bud (rejecting the two bottom ones on each shoot) as equal to the production of half a pound weight of fruit—that is, if the stem of the vine be five inches in girth, its capability is equal to the maturation of 25 pounds weight of grapes, and therefore the number of buds to remain after pruning will be fifty. But he refers, doubtless, to vines that have been well and carefully reared.

The twelve kinds of grapes he recommends as most suitable for culture on open walls, are *Black Hamburgh, Black Prince, Esperiore, Black Muscadine, Miller's Burgundy, Claret Grape, Black Frontignac, Grizzly Frontignac, White Muscadine, Malmsey Muscadine, White Sweetwater.* But young beginners and people in the country generally, would do well to confine their attention to the *Catawba*, the *Isabella* and the *Sweetwater*, and to see what may be made of native grapes, yet to be tamed and meliorated. The same results may not be reached, precisely, with us; we merely give this sketch to let the young agriculturist see that there are principles to be sought in everything, and he should regard as a flagrant indignity and insult to his profession any insinuation that it is not a business of Art and Science as well as building and navigating a ship. But perhaps the young reader is content to consider his farm in the light of a ship, and to go himself as a common sailor before the mast? If so, why all we have farther to say is, that he must be left to his fate—*Quisque suos patimur manes*—"Each has his fate, and bears the lot he drew." And the lot of all such drones is, like that of agriculturists generally, to be saddled and bridled and ridden by any demagogue partisan who can first get his foot in the stirrup. In matters of public policy, and their real bearing on the landed interest, farmers rarely inquire—rarely think for themselves. Their party faith, once pinned on their sleeves by some leader, who is himself led by some higher leader—all in search of office, big and little—there it sticks forever. In politics, as well as

in farming, they mistake doggedness for consistency, and look on all change of opinion as an apostacy of principle. For such men was written the following

SONG.

I 'LL FARM LIKE MY FATHERS BEFORE ME.

When my landlord says "John,
You must really get on—
Just see how your neighbors are striving;
We must be improving,
And onward keep moving;
Depend that 's the right road to thriving"—
"Sir, I pay when I can;
I 'm a hard-working man;
At elections you know, you get o'er me.
Let them do as they may,
I prefer the old way—
I 'll farm like my fathers before me.

"There is Berwickshire Dick—
Of the fellow I 'm sick—
They say that his crops are so charming;
And there is East Lothian Will,
He is worse and worse still;
They boast—*how* they boast of his farming!—
Everything is so good,
And so well understood!—
It 's all just to chafe and to bore me:
But I care not a jot,
For I value them not—
I 'll farm like my fathers before me.

"There 's nothing but toiling
At draining, subsoiling,
And grubbing old hedge-rows and fences;
It is all very neat,
When the thing is complete,
But dreadful to think what expenses!
Should I spend on the land,
I cannot understand
How cash it again would restore me:
I shall therefore take care
Aught that I get to spare
I 'll keep like my fathers before me.

"To the markets they ride,
In the flush of their pride,
As if they were pinks of creation;
On the best they will dine,
And sit over their wine,
And talk about crops and rotation;
But how they do contrive
To get RICH—man alive!
That certainly RATHER *gets o'er me!*
But I care not a jot,
For I envy them not—
I 'll farm like my fathers before me.

"There 's such new-fangled ways
About dung now-a-days,
Whole islands have gone to destruction;
It 's absurd to suppose
That so tiny a dose
Can greatly increase the production.
About liquid manure
I 'm not quite so sure;
But *trouble* and *tanks*, I abhor ye!
'T was my old father's song:
'Jack, thou 'lt never do wrong
To farm like thy fathers before thee.

"Improvements in breeding,
And new modes of feeding;
'Bout Science they 'll preach you a sermon.
They may boast of Liebig,
But I care not a fig;
He 's nought but some cunning old German.
They talk about gases
Like thundering asses—
Such nonsense shall never get o'er me.
I have just this to say:
I prefer the old way—
I 'll farm like my fathers before me."

ANALYSIS OF INDIAN CORN.

THIS long-sought desideratum is at last likely to be obtained. We have had analyses of the grain of Indian Corn, as well in America as in Europe. We have already published in this Journal, in June of last year, the results of examinations of the *grain*, made by Fromberg, and by Letellier—and of the *ash* of the corn *blade*, by Hruschauer. In the latter case the analysis was of the "straw" of corn grown on different soils—the first on a soil formed from the debris of primary rocks, the second on a mountain limestone—and the result showed great difference, both in the total per cent. of the ash left, and in the proportions of every one of the constituents which the ash contains.

The mean of the two specimens from these different soils was:

Potash	9·62	Phosphoric acid	17·08
Soda	26·30	Sulphate of lime	1·19
Lime	7·97	Chloride of sodium	3·42
Magnesia	6·64	Silica	26·97
Oxide of iron	0·81	Total	100·00

The per centage of ash was in one case 2·30; in the other, or that from the limestone mountain land, 6·50—mean, 4·40. Thus, says Professor Johnston, 60

bushels of corn, each 60 pounds, which he says "is considered a good [he might have said great] average return even in favorable districts, supposing them to yield 1½ per cent. of ash, which is about what is left by the *grain*, would carry off the land 54 pounds of inorganic matter, consisting of:

Potash and soda	16·6	Phosphoric acid	27·1
Lime	0·7	Silica	0·4
Magnesia	9 2	Total	54 0

According to the analysis made by Letellier, it would seem that the ash of Indian Corn consists almost entirely of the phosphates of potash, soda, and magnesia. Should not the corn-grower take heed of such things? But Professor Johnston notes—what we have repeatedly referred to and urged upon those whose business it is to take measures to get the information—"We have no accurate returns," says he, "of the *proportion which the weight of the straw and leaves bears* to that of the corn of the same plant."

The New-York State Agricultural Society, with becoming attention to what Agriculture really needs for its enlightenment and progress, has, we believe, taken steps to obtain this information.

In our so-called National Census, no notice whatever is taken of any part of this great staple of the country, except of the *grain*.

In the last number of this Journal we have given, moreover, the *average composition*—that is, the proportion of water, woody fibre or husk, starch, gum, sugar, gluten, albumen, fatty matter, saline matter, &c., in more than twenty of the common grains, roots and grasses—as nearly as the present state of knowledge has enabled the most scientific men to represent it—*Indian Corn* among the rest. The same number of this Journal gives the average produce of nutritive matter per acre from a given quantity of each—including Indian Corn. If, in England or France, the subject possessed half the interest that it does for America, it would have been yet far more thoroughly investigated. What is needed for the information and government of American agriculturists, in respect of a grain cultivated throughout the length and breadth of the whole country, is, as we have repeatedly urged, to have a careful analysis of each part of the plant, as well in its green as its dry state—its stalk, blade, top, shuck, and cob, as well as the grain—and it is highly desirable to know the *proportion* of each of these parts to a given amount of grain. We mean not the *exact*, but the general, ordinary proportion in different parts of the country, where very different kinds of corn are suited to the climate, and where, therefore, very different proportions will prevail. The practical benefit would be of great and almost universal value. It would enable every corn-planter, on measuring his *grain*, which most of them do, to approximate, at least, the quantity of nutritive matter besides, which his fields had yielded him per acre, in return for his outlay. This is, as we have before stated, the sort of real, solid, noiseless service that the American Institute ought to be rendering, instead of hoarding up its money in stocks, to lay by for a chance at a speculation in farms and colleges, if the State can be persuaded to establish one and put it under its "auspices." For one, we will willingly contribute a set of The Farmers' Library, containing 6 vols. of about 3,500 pages, and three of which contain works that could not be imported for less than $35, with several hundred engravings—many of them costly steel engravings and lithographic prints; we will gladly throw in these six volumes toward getting these investigations *carefully* made.

Mr. Colt, of Paterson, long since offered $100 toward getting it done, if the American Institute, with its thousands in "5 per cent. stocks," would undertake it.

In the meantime, however, a friend of Professor Jackson, of Boston, (whose name is a guaranty for the accuracy and soundness of the research,) having called his attention to the patriotic offer of Mr. Colt, has consented, as we have been informed, to make the analysis—not in any consideration of the sum named, liberal as that was, on the part of an individual, no more interested than others, but, as it is but just to say, in a high public spirit to render service to the cause of Agriculture and of Science. It will presently be seen that Professor Henry says the work of a complete analysis will require much labor, and cannot be completed *under a year or two;* and we may mention that, on application on this subject to Professor Norton, than whom there need be no better judge, doubtful if he could for some time command leisure to undertake it, he thought it could not be expected to be properly done for less than $500. This may give some idea of the labor and care to be bestowed on what men like ourselves, not possessing the science and apparatus for such investigations, are apt to look on as mere trifles. Such investigations are, or ought to be, provided and well paid for by Institutions and Societies that hold in trust the money of the public for the benefit of the public, and ought not to be a tax on individuals, however able and liberal. Such men have always calls enough upon their generosity from quarters that have no claim on public institutions. We rejoice, however, now to see that the *Smithsonian Institute* will, as soon as may be, take this, and doubtless other analogous matters in hand; and we only express the public voice when we say that what has the sanction of the really learned Secretary of *that* institution, the public will believe in. The American Institute, with its thousands in stocks, and all other such Institutes, far from hesitating and holding back, and *talking* on such occasions, ought to be constantly on the look-out for opportunities like these to benefit great public interests of which it professes to have supervision. But seeing now that the Smithsonian Institute, or the Patent Office, will undertake to have this laborious and tedious analysis thoroughly made, do we go out of the way to suggest that it would be but fair to relinquish all claim on the liberality of individuals either for contributions in money, or yet greater contributions in labor and in precious time, which is but too often the only capital of men competent to push such inquiries to reliable results?

How much better would the thousands laid up in "5 per cent. stocks," be employed in eliciting from such men, and from skillful mechanicians, analyses, dissertations and inventions calculated to economize and render more efficient the labor and the means employed in all our industrial pursuits, and in importing at once drawings, models, seeds, grains, fruits, machines—in a word, whatever may be discovered abroad, or whatever the wants of Industry suggest as needed, and which may possibly be discovered at home under the stimulus, not of picayune medals and blank diplomas, to be filled up to order, but liberal rewards for the time and labor bestowed by men who have nothing else to depend on? Suppose, for instance, instead of merely providing a show-ground for the advertisement and display of highly polished hats and boots, and specimen saddlery and cutlery, and overgrown bullocks, and huge carrots and turnips, none of which display any new principle, or add a mite to the stock of knowledge connected with the arts of Agriculture or Manufactures, they were to offer to Professor JOHNSTON, of world-wide renown, some adequate inducement to come over and deliver a short course of Lectures on the application of Science to Agriculture, which might be published and disseminated throughout the coun-

try, with far more benefit than the mere statistical *facts* and ascertained results of practices with which every one is familiar—such as make Patent-Office Reports, Shipping Lists, &c.?

Thanks, however, to men of real activity of mind and genuine public spirit, we are in a fair way, as may here be seen, to have a least a thorough analysis of Indian Corn—such as we should have had years ago, at the cost of thousands on thousands of dollars, if necessary, could it have been made probable that at the bottom of the crucible we should find some improved and more efficient mode of *shedding human blood?*

JOHN S. SKINNER, Esq. CLEVELAND, O., March 27, 1848.

Dear Sir: Professor Henry has sent me the following analysis of Indian Corn, which was made by M. Payen, which he thinks may be relied on, viz:

Starch	28·40	Cellular tissue	20·00
Nitrogenized matter	4·80	Dextrine	2·00
Fat matter (oil)	35·60	Various salts	7.20
Coloring matter	20	Total	98·20

Prof. Henry says that an acuurate analysis of the various plants and grains used in domestic economy in this country is a *desideratum*, and that he had just had a conversation with the Commissioner of Patents on the subject, and that they had concluded as soon as practicable to have an analysis made, either at the expense of the Smithsonian Institute, of which the Professor is Secretary, or of the Patent Office. The Professor states that the work will require much labor, and cannot be concluded under a year or two. Knowing the anxiety of he public for a work of this utility, I hasten to inform you of it.

Yours, respectfully, J. R. STAFFORD.

Extract of a letter to the Editor of The Farmers' Library, from A. G. SUMMER, Esq. Editor of the "South Carolinian."

"I see that Mr. Colt is desirous of having an analysis of Indian Corn. My brother, who has been a pupil of Liebig for one and a half years, is now engaged under his direction in making a correct analysis of Indian Corn, the Cotton plant and Indian Pea, as I sent him the ashes, and also the stalks, grain and seed of all these plants. When he does make it, I will send you an account for The Farmers' Library."

REPORT ON IMPLEMENTS,

BY THE AGRICULTURAL COMMITTEE OF NEWCASTLE COUNTY, DELAWARE

THE following Report is worthy of particular attention, showing that greater progress has been made in the little State of Delaware, than in any in the Union, porportionally to her size and population, in the way of *introducing the most important and highly finished labor-saving implements;* a matter much more worthy of the regard and encouragement of Agricultural Societies, than hundreds of other trifling objects on which they bestow their attention, and of which the chief purposes are to amuse and gull the public, without doing any *real service to Agriculture*—to keep up a sort of gambling spirit, miscalled emulation.

Our agriculturists are themselves so little instructed—as they should be at school—in the principles of labor-saving machinery, (what, in truth are they instructed in that relates to their *own* profession?) that one of their first cares should be to stimulate and reward the ingenuity of artisans and machinists, who strike out things for their use, which economize labor and are valuable in the field. They ought to remember that a machine that will save the labor of one

man even, or one horse, is worth to them every year what it would cost to pay and feed a man; and yet much more where it saves the labor of a horse, for it will cost as much to keep one horse as to keep two men. True, you pay no wages to the horse, except the interest on the sum he would sell for, or what he cost; but then he is liable to be killed any day or night by a small worm, and your capital is lost forever. The machine eats nothing; and yet for showing an overgrown stallion or bullock—which any one may raise and fatten—the exhibitor gets the *highest prize* at the command of the Society: but for the exhibition of an improved machine, which is the product of much and anxious intellectual exercise, and which displays the finest combinations of mechanical principles, and which it is expensive to exhibit, as it must be transported and can 't walk to the Shows, our wise Institutes and Societies reserve a quire of blank printed "*Certificates of Merit*," which they fill up to order, and which, costing a picayune each, are often filled up for things that get lauded to the skies at the time, and are never more heard of.

The trial of machines should be conducted by accomplished engineers and men of science; such, for instance, in Delaware, as Major Trimble and Doctor Thompson, united with practical and disinterested farmers,—as Jones and Reybold, and Clark—men of known abilities and experience, who could not be made noses of wax, and who would only decide on the most careful and thorough trial; and it would be much better even to pay such men well for their time, than to hoard up the money of these Institutes and Societies, for the sake of saying they have "*so much stock in the funds!*"

The New-York State Society has laid by eight thousand dollars, and the American Institute perhaps as much. The former has very wisely and in a proper spirit offered premiums, we believe, to the amount of more than six thousand, while the latter buys stocks, and lays by for a chance at a Farm, and a *wing* of a College, if the State will only buy the *body*, and put the whole fowl in their keeping; or in other, if not such plain words, "*under the auspices*" of the American Institute—instead of offering all, except enough to meet the expenses of their next meeting, for essays on subjects which agriculturists need to be enlightened upon, and for objects that it would not fail for the benefit of Agriculture, to bring into activity the genius of all the great machinists of the country and the world!—for in such cases, we should not confine ourselves to any country, but take the best and most perfect and economical contrivance, if invented by the Old Boy himself, and be glad to get that much out of him for the good of mankind. Why not, out of their thousands that are hoarded up, offer $500 for some *new and valuable application of Steam to Agriculture?* Why not have traveling steam machines, going through the country cutting ditches and draining marshes, and digging ice-houses and cellars, and making roads, boring for water, and for marl, coal, and other minerals?

Go into your towns, and see there what it is doing for the printer, and the cabinet-maker, and the carpenter, and the ship-builder—all the branches of manufactures and mechanics! Go into your Government Arsenals and Navy Yards, and see what steam is doing in the way of forging and finishing chain cables, and cannon and small arms, even to making screws for gun-locks, and how much labor and money it has been made to save in the preparation and repair of all the engines of human destruction! because these economical uses of it have been elicited and paid for, by the Public Treasure of the country, and that, too, collected chiefly from the *cultivators of the soil! But what is Steam doing for Agri-*

culture? Has the Government ever offered one dollar to reward any application of that mighty power to agricultural or peaceful productive purposes? *No, not one!* And what are the lazy drones about, who compose our Agricultural Committees in Congress, and in all our States, that they do not, or dare not begin to inquire into what might be done, and what the farmer and planter have a right *to demand* should be done in this direction? For Col. Emory's or Col. Fremont's or any other *military* survey, there is no difficulty in getting thousands on thousands voted by those in Congress, who are sent there by farmers and planters. They have no scruple in giving $100,000 of their constituents' money, to have an examination made even of the "Dead Sea," but not a dollar for an agricultural survey.

For the maintenance of a single seventy-four afloat, the Nation pays as much ($200,000 annually) as would maintain a Normal School in every State in this Union, for qualifying teachers for our Common Schools, to give instruction in the application of Geology, Botany, Chemistry, and Mechanics, as applicable to the practice of Agriculture; and yet our Agricultural Committees and Societies look on passively upon such infamous prostitution of the powers and ends of Government, without the energy or courage to lift one voice against it. Can any people who submit to such imposture and abuse, claim to have emerged from a state of barbarism? and yet we boast of the blessings of free and of self-government!! paying for warlike establishments 80 per cent. of all our expenses!!!

REPORT OF THE COMMITTEE.

The Committee on Agricultural Implements regret that farmers and mechanists have been so remiss in not bringing out valuable implements, known to have been put in successful operation, within a few years, in different parts of this country and this State—among which are,

1st. *Hussey's Reaping-Machine*, upward of thirty of which are owned in this County. Twenty of these were introduced the last harvest, varying in price from $100 to $175 each. The work done by them has been eminently satisfactory the past season. Mr. Bryan Jackson and Col. J. W. Andrews report that they cut—with one of the largest size—24 acres of heavy wheat in one day. Mr. Wm. Bowman reports that he cut 14 acres in half a day. These are extra days' work, and can only be accomplished with good horses and at good speed. From 15 to 20 acres may be deemed a fair day's work.

2d. *Hussey's Mowing-Machine*, with cutters on the same principle as those of the Reaper, has been successfully tried in this County, and if done at the same speed, will cut from 10 to 15 acres per day.

3d. *Pennock's Drill.*—This implement has been in use 5 or 6 years, with great success. W. J. C. Clark, the President of the Newcastle County Agricultural Society, stated before the Society that he sowed a part of his field with this drill last year, at the rate of one and one-fourth bushels of wheat to the acre, and that the yield of the drilled was more than double that of the part of the same field upon which two and a half bushels of wheat had been sown to the acre broadcast.

4th. Mr. J. Carr, of Brandywine Hundred, has recently imported a drill from England, at a cost of nearly three hundred dollars. This machine has the management box, and is constructed so as to sow the concentrated manures, poudrette, guano, ashes, &c., at the same time of sowing the wheat.

The thanks of this Society and the farmers of the County are due to Mr. Carr for his public spirit in sending to England (his fatherland) an order to purchase the best and most improved implement of the kind in the Kingdom, regardless of cost, (in which he was most fortunate, as he got the identical implement which took the first premium at the Royal Agricultural Exhibition)—particularly when it is known that he (Mr. Carr) has invited all farmers and machinists to

come forward and examine it, and to build and use from the same pattern free of charge.*

5th. *Threshing-Machines.*—We have in St. George's Hundred four superior Threshing-Machines or Separators, which get out and clean the wheat ready for market at the one operation, 400 bushels per day, if well attended. The first two of these Separators were brought from Rochester, New-York, last June, by B. F. French & Co. The other two were purchased, and are now owned, by J. & Isaac Woods, of St. George's. They have all been used with much success.

6th. *Hemp-Brake.*—A Hemp-brake of simple construction has been invented and patented by an ingenious fellow-citizen, Mr. Frank Holcomb. It has been successfully tried in the presence of a portion of this Committee, who doubt not that the implement will eventually be nearly as valuable to the hemp-grower of the West as Whitney's cotton-gin was to the cotton-grower of the South.

7th. There is one other huge machine, which has been in operation for nearly one year, throughout the land, which has been highly spoken of by its inventors, and by the Editor of the Gazette particularly, as the best implement for the farmer ever yet invented or used in this country. The Committee not being instructed by the Society to examine or report on this thing, will take this occasion to remark that it is customary among some inventors (tinkers, perhaps,) to offer their invention one year on trial; but if at the end of that time the article did not answer the purpose for which it was intended, then the inventor gave up the experiment, and replaced the old machine. It is hoped the inventor of this thing will follow the example set by that good old custom, if at the end of the year their invention should be deficient. This machine is called the "*Tariff of* 1846." It has had a fair trial. Will they do it? The Committee farther remark that, if they or either of them should ever be placed by their fellow-citizens in a situation that would require them to make a Report on such an article, they will give the subject all that consideration that its importance would demand, to the extent of their limited information.

J. JONES,
H. CAZEIN,
J. CLAYTON, } Committee.

PATENT OFFICE REPORT.

MR. FLEISCHMANN'S PAPER ON GERMAN SHEEP CULTURE.

By the politeness of one of the Editors of the New-York Courier and Enquirer, which we gratefully acknowledge, we have received copious extracts from a paper on German Sheep Culture, (in the forthcoming Patent Office Report), by Mr. Charles Fleischmann, "formerly a draughtsman of the Patent Office." The information which he gives us in relation to the German management is interesting, as might be expected from a candid and accomplished observer; but so far as our extracts go, seem to us not new in many important particulars. The same has, for the most part, been published by European and American writers on Sheep Husbandry.

[* This is exactly the sort of service which ought to be expected from great National Institutes and State Societies, instead of leaving the cost, risk and trouble to individuals. Those who collect money in hundreds and thousands should be required to look after and import all such things; and we have no hesitation in saying that the nation that would give a medal or a sword for bloody execution done in the barbarous trade of war, in preference to bestowing higher distinction on such an act as Mr. Carr's, is only half impressed with the true spirit of civilization; that it has but an imperfect perception of its true interests, and deserves not the name of an enlightened and free People. *Ed. Farm. Lib.*]

Mr. Fleischmann (himself a German,) falls into a very common error among writers, in apparently not bearing sufficiently in mind that what may be proper and economical in one country, may be precisely the reverse of all this, in another. In Germany, land is dear, and is economized to an extent of which an American would form little conception: labor, on the other hand, is plenty and cheap. The German system of managing sheep, given by Mr. Fleischmann, would cost more, here, than the wool would sell for. Expensive stabling in winter, conducted with a degree of attention which requires the temperature of the stables, even, to be constantly regulated by a thermometer—regulations for summer pasturage involving the same constant care—more than many of our hardy pioneers bestow on their *children*—will never do in this country. Mr. Fleischmann gives *fourteen* rules for *pasturing* sheep, every one requiring the constant attendance of men—in the aggregate of a good many men—if the flock be large! This will never do in the United States. It is contrary to all the habits of our people. And, as our New-England brethren expressively say, "*it won't pay.*" An American farmer will smile to be told, for example, that at some seasons of the year, the sheep should be driven about their pastures, when they first enter them, to cause the *spiders* to "fly to their retreats" to prevent their *being eaten by the sheep*, which (the *eating of spiders*) "causes a slight purgation!" They are to be driven about stubble and grass lands in the fall to "take off the *cobwebs* with their legs," which when eaten by the sheep "seem to have injurious effects!" These are from Mr. Fleischmann's 6th rule for pasturing.

And the American farmer will be likely to be still more struck at the 9th rule, which we give verbatim, the italicizing, however, being our own:

"Nothing is so injurious to sheep and *wool* as a sudden fright. In the night, when they are penned, in the open field, when there is a storm approaching with heavy thunder, the shepherd must *walk around the pen and talk to them in order to quiet them.* When they get much frightened, they rush to one side of the hurdles, upset it, and break loose."

Many of Mr. Fleischmann's general propositions in relation to the comparative adaptation of different countries, and different parts of our own country, to wool culture, the future demand and supply, markets, &c., correspond with those previously published in this Journal, in the very comprehensive series of Letters on Sheep Husbandry, by Colonel Henry S. Randall. Mr. Fleisch mann's views, however, have nothing of the fullness, detail, and array of corroborating facts possessed by Col. Randall's.

In one point they differ, however, and *we* entirely agree with the latter gentleman in the premises: Mr. Fleischmann quotes the statements of a German writer by the name of Elsner, that "highly improved sheep do not last well in this country," meaning thereby, as we judge by the context, that the high quality of wool of highly improved sheep cannot be kept up in this country. Mr. Fleischmann remarks on the low quality of our wools, but excuses it as follows:

"The fact is we have as yet imported very few highly improved sheep, and the few that were brought here *were neglected in consequence of the want of knowledge, or that indefatigable attention which the Merino (Saxon) sheep requires.*"

Had Mr. Fleischmann seen the Saxon wool of the best American flocks, when he expresses this impression? When he speaks of the *ignorance* and *neglect* of American growers of fine wool, did he know anything of the Groves, the Swifts, the Beekmans, the Tildens, and the Morrels of New-York—the Smiths of

Connecticut, the Grants of New-Hampshire, the Perkinses and the Browns of Ohio, the Edgingtons of Virginia, &c. &c.? We may perhaps better judge from his own admission, whether he possessed the requisite facilities for knowing that would seem to be necessary, to justify him in so summarily pronouncing against the care and intelligence of the American wool-grower. Immediately after the extract above, he continues:

"As far as my own observation goes, I have found that the wool grown in the United States, has a remarkable softness. *I have not yet seen wool from very highly improved sheep; the samples which came to my notice were, with the exception of a few, from good half-bloods;* but even that coarse kind had a high degree of softness."

Our climate has done much for us: even our half-blood wool is uncommonly soft—the fault is all, as he seems to think, in the badness of the sheep originally imported, and in the ignorance and carelessness of our breeders! and thus it would appear that he judges rather hastily, as we respectfully think, without farther investigation, after inspecting samples of our *half-blood wool!*

Had Mr. Fleischmann ever heard of Henry D. Grove, who unfortunately died in the very prime of his manhood, some four or five years since, in Rensselaer County, New-York? Born in Saxony, the nephew of an extensive wool-grower, on whose farm he was brought up, educated to the care and selection of choice Saxon sheep from childhood, a man of concededly exquisite judgment in sheep —who doated on them, and spent his life among them—a man of intelligence and of an integrity which was never even suspected: what does *he* say about the sheep imported to this country from Germany? He says *he* imported *picked sheep* from the *choicest flocks in Germany.* True, many of these were adulterated by being bred in this country, with mongrels imported at the same time.—But not so with Mr. Grove's own flock. He selected them in Germany, imported them himself, and bred them pure. And we are farther knowing to the fact that but a few years before death, he sent his experienced and trusty shepherd to the most celebrated flock of Germany to procure, without regard to price, rams to improve his flock—that the shepherd returned without purchasing, as he decided that he could find no rams which would improve Mr. Grove's flock. Mr. Grove repeatedly sent specimens of his wool to Germany to be compared with that of the best flocks, those thought to combine the most good properties, and the comparison never resulted to his discredit. Now one thing is certain. We can name a number of other flock-masters in different States who breed as fine wool, and as good sheep in other respects, as did Mr. Grove.

Was Mr. Grove ignorant of his business or careless? The results already stated show. And equal results among American breeders, show *as much in their favor.*

We grant that finer wool is occasionally grown from a little, delicate pound, or pound and a half, fleeced sheep, in Germany, than it is *common* to grow in the United States, though it is not unusual to see such individual sheep here. Our flock-masters usually exclude such feeble, over-bred sheep from their flocks. Their wool will not pay for the cost of producing it. Had Mr. Fleischmann have said, therefore, that it was not common to grow as fine Saxon wool in the United States, as is sometimes grown in Germany, we should have taken no exceptions to his remarks. Mr. Grove and our other breeders have thought it took something besides extreme fineness of wool to make good sheep. The price of labor and wool here, will not permit sheep to be nurtured with more care than our *babies!* But when he asserts that "few highly improved sheep have been im-

ported into this country," and those few spoiled by *ignorance* and *want of attention*, we must take the liberty of excepting to such wholesale assertions.

Two years since, a flock was imported into Connecticut by Mr. Tayntor, selected with infinite care from the best to be found in Europe.

THE OSAGE ORANGE FOR HEDGES.

The Osage Orange (*Maclura aurantiaca*), known also, by the names of "Osage Apple," "Bow-wood," and *Bois d'arc*, is indigenous to Arkansas, Texas, and Upper Missouri, and may be safely cultivated for hedges or ornament wherever the Isabella grape vine will thrive and mature its fruit in open air. In its natural habitat, the Osage Orange forms a beautiful, deciduous-leaved tree, often growing to a hight of twenty-five to thirty feet, with a trunk from twelve to eighteen inches in diameter; and in very favorable situations, it sometimes attains double these dimensions. The general appearance of this tree greatly resembles that of the common Orange; and when we view the beauty and splendor of its dark, shining foilage, large, golden fruit, and the numerous sharp spines which the branches present, we are strongly impressed by the comparison. The juice of the young wood, leaves, and fruit, consists of a milky fluid, of an acrid or insipid taste, which soon dries on exposure to the air, and contains a considerable proportion of an elastic gum. The fruit, however, in open culture, does not ripen its seeds north of Philadelphia.

The most important use to which the Osage Orange can be applied is for the formation of hedges, and there is no plant, in our estimation, better adapted for this purpose,in any part of the country where this tree will thrive. Apprehensions have been expressed by some that, from its rapid growth, it will soon become too large for live hedges, which, it is thought, will not endure for a great length of time. This, however, remains yet to be proved. We have no doubt, in our own minds, that, if a judicious system be pursued, in trimming and *heading down*, they will serve an excellent purpose for twenty and perhaps thirty years; for there are hedges of this plant in the vicinity of Cincinnati, which are ten years old, and have thus far proved perfectly hardy, very uniform, neat, and handsome in their appearance, and free from the attacks of insects or disease.

The Osage Orange may readily be propagated by seeds, from which it will grow sufficiently large in three years to form a hedge. It succeeds best on land moderately rich, such, for instance, as will produce good Indian Corn; but it will grow in almost any soil that is not too moist. The line of ground, intended for a hedge, should first be dug and well pulverized, say from 12 to 15 inches deep, and 2 feet wide, along the center of which the plants may be set at a distance of one foot apart.

The seeds, before sowing, should be soaked in water, in a warm room, for four or five days; or they may be mixed with equal parts, by measure, of sand, and exposed a few weeks, in open boxes, to wintry weather, on the sunny side of a building, in order to freeze and thaw. It is preferable to sow them early in the spring, in a garden or nursery, where they will shortly germinate and form young plants. These should carefully be weeded or hoed during the first season's growth, and transplanted in the hedge-line in the month of March or April of the following year.

NOTES ON MANURE.

Liquid Manure.—As liquid manure is likely to become in general use by our agriculturists, and as Government has issued an order that manure-tanks shall be established in the yards of the different cavalry barracks throughout the United Kingdom, the following *memoire* on dung-pits and the treatment and great advantage of liquid manure, so long neglected on the Continent and in this country, has been presented to the Society of Sciences, Agriculture and Arts of the Department of the Lower Rhine, by Ch. H. Schattenmann, Member of the General Council of the Lower Rhine, and Director of the mines of Bouxwiller. After giving a description and a plan of his model dung-tanks, which can be made to any size, from an old sunken cask to a well-bricked pit, with a filtrating-vessel, and pump with irrigating tubes, to disperse it over the land, he then gives his method of treatment:—The dung is submitted to a fermentation, so that the straw becomes decomposed and the ammonia developed. This fermentation is extremely violent for horse-dung, producing a great heat. It is therefore requisite to overcome it, which is easily accomplished by packing the dung as closely as possible, and well watering it once or twice a week; as the con

fining it moderates the fermentation by preventing too great an access of air, and the water soddens it and hastens the maturity of the dung, so that by this means in six weeks or two months is obtained a perfect manure. He had at several periods thus disposed the dung of 200 or 300 artillery horses, quartered at Bouxwiller, which he placed in a pit containing two compartments of 400 square metres (1,200 feet) in surface, by filling them up from 9 to 12 feet. On opening these large masses, they always presented in every part of the interior a perfect manure, and as substantial and stronger than that of cow-dung. Horse-dung is more substantial than that of horned cattle, but it often loses its quality by a too violent fermentation, from which few know how to preserve it, and which burns and moulders a portion of the straw, and drives away the ammonia by evaporation. Little attention is generally paid to the large quantity of water required for horse-dung, which causes a continual evaporation. It should therefore be well watered from a pump that spreads it over every part, and saves much labor, while at the same time the water penetrates so that the heap at last becomes so compact that it is a solid mass. Some parties have the plan of raking up or turning the dung, thinking to make it turn the sooner; but this has a bad effect, as it becomes musty and often spoils—being more accessible to the air it ferments more violently, and soon loses its humidity, which, when closely packed, it preserves.

This manure enjoys great reputation in Switzerland, where it is chiefly used in watering the prairies [meadows], and frequently the dung is washed so as to increase the strength of the liquid. This is well suited for that country. Liquid manures, such as purins and fecal matters generally, only fertilize but one crop, and they usually try to expend them during damp or cloudy weather, because a burning sun would evaporate the carbonate of ammonia before the plants over which the liquid is sprinkled could absorb it. But when the carbonate of ammonia of these liquid manures is converted into sulphate or muriate, by sulphate of iron, sulphuric acid, muriatic acid, or chalk [gypsum?], there is no longer any loss of the ammonia by atmospheric influences, and the effect of such manure is felt for several years, according to the more or less quantity irrigated. He has conveyed every week to the dung-tank or pit, the fecal matters from the schools of Bouxwiller, and he has found it quite unnecessary to have a special reservoir to unite these matters. The water-closets of the schools of Bouxwiller are arranged with movable tubs, in which is placed previously a solution of sulphate of iron, which, by disinfecting fecal matter, prevents every nauseous smell or inconvenience arising from it. [English paper.

[How easy would it be for any man of enterprise, farming in the neighborhood, to collect immense stores of fertility from the privies at Washington, provided for the public buildings; and also at our watering-places. In Europe, such valuable resources bring a large revenue.

Ed. Farm. Lib.]

PROPORTION OF MILK TO BUTTER.

Sometimes it is desirable to know the proportion between the quantity of milk and the butter produced from it; for the question is sometimes presented to farmers, whether it is better to sell milk or make butter. Yet no definite rule can be given, as milk varies in richness and its butter qualities, not only from the general breed of animals, but from individuals of the same breed, and also from the food.

The difference is sometimes one-half. The Alderney cows give very rich milk, seven quarts of which will often, if not generally, produce a pound of butter; while the milk of some cows is so poor that it takes nineteen or twenty quarts of milk for a pound of butter. The famous cow, Blossoms, that gave so large a quantity of milk, did not yield a large amount of butter, as it took nineteen quarts for a pound. On an average it probably takes about twelve quarts of milk for a pound of butter.

Mr. J. Leathe, of Woburn, who has some excellent cows that give rich milk, lately made an experiment, while his cows were still fed partially on hay. He measured out thirty quarts of milk, which produced seven and a half pounds of cream, (three quarts in measure,) and three pounds three ounces of good yellow butter.

As to weight, we have various estimates as the proportion of butter to milk. In all experiments of the kind, the milk should be weighed as well as the butter. Measures such as used for milk differ greatly; so much that it seems that very little reliance can be placed upon them. From statistics now before us showing the amount of butter produced, and the quantity of milk in weight and measure, in one case it is stated that sixteen and a quarter quarts of milk weighed forty-two pounds, which is two pounds nine ounces to the quart. In another case, it stated that a cow gave twenty-six quarts of milk per day, which weighed forty-seven pounds. Here is less than two pounds to the quart. Here is but a specimen of the great variations in the measures of milk, and it shows the importance of weighing, instead of measuring milk, in making experiments. [Boston Cultivator.

LETTER XVI.

DISEASES AND THEIR TREATMENT—(Continued.)

Cachectic Diseases...Hydatid on the Brain—diagnosis—common methods of treating it—treatment of French and English veterinarians...The Pelt Rot...Local diseases...Grub in the head—the nature of the disease, if one—erroneous popular opinions—location of the grub—description of the fly (*Œstrus ovis*)—method of attacking the sheep—conduct of the sheep—appearance of the larva—its habits—the chrysalis—the larva found in the heads of healthy sheep—not believed to be the cause or source of fatal disease—Mr. Bracy Clark's and Mr. Youatt's opinion—method of preventing and of expelling the grub... Scab—nature of it—habits of the *acari*—description of them—contagiousness of the disease—post-mortem appearances—treatment...Erysipelatous scab—treatment...Disease of Biflex Canal—nature and treatment...Hoof-ail—first indications—erroneous statements of foreign veterinarians—of Mr. Youatt—author's experience with it—diagnosis—chronic hoof-ail—can it be cured?—difficulties—preparation of the foot—ordinary treatment—proper treatment—cost of curing a flock—cheap partial remedies—suggestions—contagiousness of the disease—how communicated...Fouls—cause and treatment...Bronchocele or goitre—diagnosis—treatment...Miscellaneous diseases...Poison from eating Laurel—symptoms—treatment...Sore Face—cause and treatment...Loss of cud—not a disease...Hoove—cause—symptoms—cure...Obstruction of Gullet, or choking—treatment...Fractures—treatment, &c...Method of administering medicine into the stomach...Method of bleeding...The place of feeling the pulse...List of medicines employed in treating the diseases of sheep...Ale...Aloes...Alum...Antimony...Arsenic...Blue Vitriol...Camphor....Carraway seeds....Catechu....Chalk...Corrosive Sublimate...Digitalis...Epsom Salts...Gentian...Ginger...Iodine...Lard...Lime, carbonate of...Lime, chloride of...Linseed Oil... Mercury...Muriatic Acid...Nitrate of Potash...Nitrate of Silver...Nitric Acid...Opium...Pepper... Pimento...Rhubarb...Salt...Sulphate of Iron...Sulphur....Sulphuric Acid....Spirit of Tar....Tar... Tobacco...Turpentine...Verdigris...Zinc.

CACHECTIC DISEASES.

HYDATID ON THE BRAIN.—This disease, known as turnsick, sturdy, staggers, etc., is spoken of by Chancellor Livingston, and other writers of reputation, as having occurred in this country within their own observation. I have never seen a case of it, and shall be obliged, therefore, to make use of the descriptions of others. Mr. Spooner says:

"The symptoms are a dull, moping appearance, the sheep separating from the flock, a wandering and *blue* appearance to the eye, and sometimes partial or total blindness; the sheep appears unsteady in its walk, will sometimes stop suddenly and fall down, at others gallop across the field, and after the disease has existed for some time will almost constantly move round in a circle—there seems, indeed, to be an aberration of the intellect of the animal. These symptoms, though rarely all present in the same subject, are yet sufficiently marked to prevent the disease being mistaken for any other. On examining the brain of sturdied sheep, we find what appears to be a watery bladder, termed a hydatid, which may be either small or of the size of a hen's egg. This hydatid, one of the class of entozoöns has been termed by naturalists the *hydatis polycephalus cerebralis*, which signifies the *many-headed hydatid of the brain;* these heads being irregularly distributed on the surface of the bladder, and on the front part of each head there is a mouth surrounded by minute sharp hooks within a ring of sucking disks. These disks serve as the means of attachment by forming a vacuum, and bring the mouth in contact with the surface, and thus by the aid of the hooks the parasite is nourished. The coats of the hydatid are disposed in several layers, one of which appears to possess a muscular power. These facts are developed by the microscope, which also discovers numerous little bodies adhering to the internal membrane. The fluid in the bladder is usually clear, but occasionally turbid, and then it has been found to contain a number of minute worms."

According to Mr. Youatt, this disease attacks many of the weakly lambs in the English flocks. It usually appears, he remarks, "during the first year of the animal's life, and when he is about or under six months old." It succeeds a "a severe winter and a cold, wet spring."—He says:

"If there is only one parasite inhabiting the brain of a sturdied sheep, its situation is very uncertain. It is mostly found beneath the pia-mater, lying upon the brain, and in or upon the scissure between the two hemispheres. If it is within the brain, it is generally in one of the ventricles, but occasionally in the substance of the brain, and, in a few instances, in that of the cerebellum. . . . .

This is a singular disease; but it is a sadly prevalent and fatal one in wet and moorish districts. . . . . It is much more fatal in France than in Great Britain. It is supposed that nearly a million of sheep are destroyed in France every year by this pest of the ovine race. . . . .

The means of cure are exceedingly limited. They are confined to the removal or destruction of the vesicle. Medicine is altogether out of the question here."

Many barbarous methods have been adopted to rupture the hydatid, which I will not disgust you by repeating. Mr. James Hogg thrust a wire up the nostrils of the sheep, and through the plate of the ethmoid bone *into the brain*, and thus, as he assures us, punctured the hydatid and "cured many a sheep!"* This practice, which I cannot characterize otherwise than as atrocious, is justly condemned by Mr. Youatt. The dotted lines *d*, *e*, and *d*, *d*, in fig. 49, show how limited a portion of the brain could be reached with a wire or trochar by piercing the plate of the ethmoid bone—the only portion of the walls of the skull thin enough to be so pierced by a trochar introduced at the nostrils.

Mr. Parkinson "pulled the ears very hard for some time," and then cut them off close to the head! †

Where the hydatid is not imbedded in the brain, its constant pressure, singularly enough, causes a portion of the cranium to be absorbed, and finally the part immediately over the hydatid becomes thin and soft enough to yield under the pressure of the finger. When such a spot is discovered, the English veterinarians usually dissect back the muscular integuments, remove a portion of the bone, carefully divide the investing membranes of the brain, and then, if possible, remove the hydatid whole—or, failing to do this, remove its fluid contents. The membranes and integuments are then restored to their position, and an adhesive plaster placed over the whole. The French veterinarians usually simply puncture the cranium and the cist with a trochar, and laying the sheep on its back, permit the fluid to run out through the orifice thus made. A common awl would answer every purpose for such a puncture. The puncture would be the preferable method for the unskilled practitioner. But when we take into consideration the hazard and cruelty attending the operation at best, and the conceded liability of a return of the malady—the growth of new hydatids—it becomes apparent that, in this country, it would not be worth while, unless in the case of uncommonly valuable sheep, to resort to any other remedy than depriving the miserable animal of life.

—

Pelt Rot—Is classified as a disease by Mr. Livingston, and various other American writers. Mr. Livingston says:

"This is often mistaken for the scab, but it is in fact a different and less dangerous disease; in this the wool will fall off, and leave the sheep nearly naked; but it is attended with no soreness, though a white crust will cover the skin from the wool which has dropped. It generally arises from hard keeping and much exposure to cold and wet, and, in fact, the animal often dies in severe weather from the cold it suffers by the loss of its coat. The remedy is full feeding, and a warm stall, and anointing the hard part of the skin with tar, oil, and butter." ‡

I have seen frequent cases of the pelt rot, but never have done anything for it, scarcely considering it a disease. If the condition of a poor sheep is raised as suddenly as practicable, by generous keep in the winter, the wool is very apt to drop off, and if yet cold, the sheep will require warm shelter.

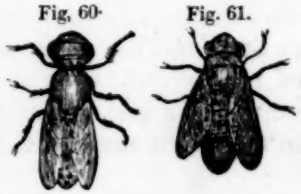
* Hogg on Sheep, p. 59.
† Parkinson on Sheep, vol. 1, p. 412.
‡ Livingston on Sheep, Appendix, p. 179.

LOCAL DISEASES.

"GRUB IN THE HEAD."—If the "grubs" found in the frontal and maxillary sinuses of the sheep actually, in any case, produce *disease*, it must be, in my judgment, by the irritation and inflammation which they induce in the mucous membrane which lines those cavities. The popular theory that the grub causes death by boring through the bony walls which surround the brain, and attacking the substance of the brain itself, is, it seems to me, utterly absurd. The only part of the skull where it could even be fancied that such a perforation would be practicable, is the cribriform plate of the ethmoid bone (11 of fig. 49,) which is very thin and is pierced with numerous small holes for the passage of nerves. But an inspection of the same figure will show that the sinus where the parasite is generally found lodged, is not in immediate juxtaposition with the cribriform plate, and that a passage from the former to the brain, would lead directly through the frontal bone—the thickest one of the whole cranium. I never saw but one grub in the cells of the ethmoid bone near the cribriform plate, and that, I judged at the time, was thrown there accidentally by the violence attending the opening of the head.* But if the grub actually penetrates to the brain, the fact would readily be disclosed after death. The full-grown grub would necessarily leave an orifice of considerable diameter through the skull. Who has seen any such orifice in the cribriform plate or elsewhere? Who has seen *any* orifice but the natural ones of the cribriform plate, *filled* with the nerves which pass through them? The farmer splits open the head of a sheep with an ax, cutting, mangling and scattering its contents, by the repeated blows necessary to effect his purpose.—Under such circumstances grubs are sometimes found scattered through all the nasal cavities—over and among the brains—and *on the ground*.—The proof is just as strong, here, that prior to opening the head, some of the grubs were *on the ground*, as that they were in the brain!

The "grub" of popular parlance is the larva of the *Œstrus ovis*, or gad-fly of the sheep. The latter is represented of the natural size in figures 60 and 61. It is composed of five rings. It is tiger-colored on the back and belly, sprinkled with spots and patches of brown. The wings are striped. The comparative proportions of the head, corslet, wings, etc. are sufficiently seen in the cuts. He who desires a full, scientific description of these insects, or who would fully investigate their habits and economy, will do well to consult the excellent monograph of them by Mr. Bracy Clark the celebrated veterinarian.

Fig. 60. Fig. 61.



SHEEP GAD-FLY.

The sheep gad-fly is led by instinct to deposit its eggs within the nostrils of the sheep. Its attempts to do this, most common in July and August, are always indicated by the sheep, which collect in close clumps with their heads inward and their noses thrust close to the ground, and *into it*, if any loose dirt or sand is within their reach. If the fly succeeds in depositing its egg, it is immediately hatched by the warmth and moisture of the part, and the young grubs, or larvæ, crawl up the nose, finding their devious way to the sinuses, where, by means of their tentaculæ, they attach themselves to the mucous membrane lining those cavities. During the ascent of the larvæ, the sheep stamps, tosses its head violently, and often dashes away from its companions wildly over the field. The larvæ re-

* The head was cloven with an *ax*! It is proper to say, however, that various writers speak of having found the grubs in the ethmoid cells, and indeed in all the nasal cavities.

main in the sinuses feeding on the mucus secreted by the membrane, and apparently creating no farther annoyance, until ready to assume their pupa form in the succeeding spring. Figures 62 and 63 give the shape and an upper and under view of the full-grown larva.

Fig. 62.

Fig. 63.

THE "GRUB" OR LARVA OF THE SHEEP GAD-FLY.

The body consists of eleven rings, colorless in the young grub, but the elevated portions growing darker with age, and becoming a dark brown when the full size is attained. There are round spots of a still darker color on each of these bands. At the edges of the rings are a few short hairs, and lower down some round darkish spots, as shown in fig. 62.—Small red spines, as shown in fig. 63, cover the space between the rings on the belly. The remainder of the body (with the exception of the posterior stigmata) is white. The tentaculæ, as well as certain appendages on each side of the anus, the purposes of which have not been discovered, are seen in fig. 63.

The larva having remained in the sinuses through the fall and winter, abandons them as the warm weather advances in the latter part of spring. It crawls down the nose, creating even greater irritation and excitement than when it originally ascended, drops on the ground, and rapidly burrows into it. In a few hours its skin has contracted, become of a dark brown color, and it has assumed the form of a chrysalis, as seen in fig. 64. Or rather, this figure exhibits the *shell* of the chrysalis, after the escape of the fly; and fig. 65 shows the upper extremity or head of the pupa, detached by the fly in its escape.

Fig. 64. Fig. 65.

SHELL OF CHRYSALIS.

The experiments of Valisnieri go to show that the *Œstrus ovis never eats*—and this is the received opinion.—The male, after impregnating two or three females, dies, and the latter having deposited their ova in the nostrils of the sheep, also soon perish.

The larva in the heads of sheep may, and probably do add to the irritation of those inflammatory diseases, such as catarrh, which attack the membraneous lining of the nasal cavities; and they are, as we have seen, a powerful source of momentary irritation in the first instance, when ascending to and descending from their lodging-place in the head. But in the interval between these events—extending over a period of several months—not a movement of the sheep indicates the least annoyance at their presence, or reveals to the veterinarian whether they exist in the sinuses or not. It would be very difficult to believe that all the local irritation which these parasites could cause, would be sufficient to terminate life, and, so far as my observation has extended, post-mortem examination discloses no lesions which would in anywise sanction such belief. The larvæ, moreover, are found, at the proper season, in the heads of nearly all sheep—the healthy as well as the diseased—and I never have been able to ascertain that the number of them is greater, on the average, in the heads of those sheep which were supposed to have fallen victims to their attacks, than in the heads of *perfectly healthy sheep* slaughtered for the table. And to prove that the popular ideas on the subject are but vague

and crude—not the result of that long and close comparison of symptoms, results, and post-mortem appearances, which would give weight to the opinions of the most unerudite—we have but to notice a few of the cases popularly referred to the "grub in the head." A sheep in the highest condition and apparent health leaps into the air two or three times, and suddenly dies, and if a grub can be found in the cavities of the head, that is the undoubted destroyer. Another wastes away for months and dies lingeringly, a mere skeleton, and the same proof establishes the same fact. Whether there has been fever or no fever—whether there has been obstinate constipation, or equally obstinate dysentery—whether one viscus or another exhibit traces of abnormal action—whether the disease has been acute or chronic—in a word, whatever the form or character of the malady—however diametrically different the diagnosis and the lesions, it is a clear case of "grub in the head," if two or three of those parasites are found there!

Mr. Bracy Clark and Mr. Youatt, so far from regarding the larva of the *Œstrus ovis* as the cause of a fatal disease, suggest that they may even *promote* the *health* of the sheep by diminishing the tendency to cerebral disease—especially determinations of blood—by establishing counter irritation! Mr. Spooner does not speak of their producing fatal effects in any instances, nor am I aware that any late scientific veterinarians do.

Treatment.—Though the presence of the grub constitutes no disease, some think it well to diminish their number by all convenient means.—One simple way of effecting this is by turning up with a plow a furrow of earth in the sheep pasture. Into this the sheep will thrust their noses on the approach of the *Œstrus*, and thus many of them escape its attacks.—Some farmers smear the noses of their sheep with tar occasionally, during the proper season—the odor of which is believed to repel the fly. Others compel the sheep to smear their own noses every week or two, by feeding them their salt sprinkled over tar. Blacklock says that the larvæ may be dislodged even from the sinuses, by blowing tobacco smoke for some moments through the tail of a pipe into each nostril. I have never tried the experiment.

—

THE SCAB.—The scab is a cutaneous disease, analogous to the mange in horses and the itch in men. It is caused and propagated by a minute insect, the *acarus*. M. Walz, a German veterinarian, who has thrown great light on the habits of these parasites, says:

"If one or more female acari are placed on the wool of a sound sheep, they quickly travel to the root of it, and bury themselves in the skin, the place at which they penetrated being scarcely visible, or only distinguished by a minute red point. On the tenth or twelfth day a little swelling may be detected with the finger, and the skin changes its color, and has a greenish blue tint. The pustule is now rapidly formed, and about the sixteenth day breaks, and the mothers again appear, with their little ones attached to their feet, and covered by a portion of the shell of the egg from which they have just escaped. These little ones immediately set to work, and penetrate the neighboring skin, and bury themselves beneath it, and find their proper nourishment, and grow and propagate, until the poor animal has myriads of them to prey on him, and it is not wonderful that he should speedily sink. Some of the male acari were placed on the sound skin of a sheep, and they too burrowed their way and disappeared for a while, and the pustule in due time arose; but the itching and the scab soon disappeared without the employment of any remedy.

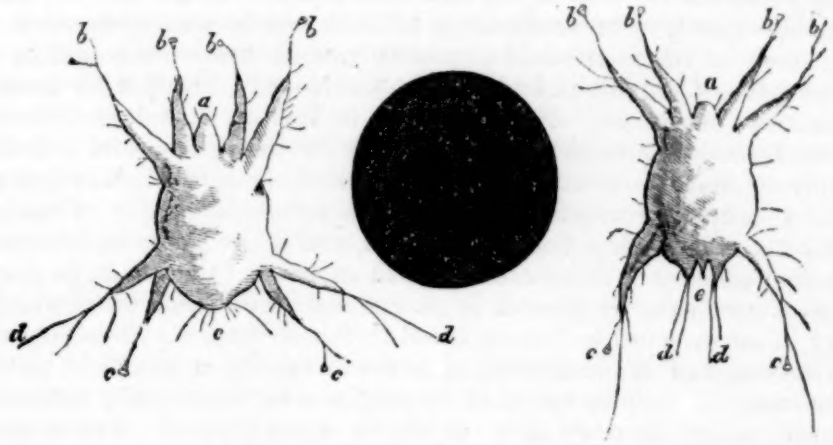
The figures on the next page are copied from M. Walz's work:

The female acarus brings forth from eight to fifteen young at a litter.

The scab is often produced spontaneously in England by mismanagement of various kinds, such as "bad keep, starvation, hasty driving, dogging, and exposure afterward to cold and wet;" and it spreads rapidly

by contagion. It is very prevalent there, and annually causes an immense loss in the wool and flesh of the British flocks. In the United States it is comparatively little known, and so far as I am able to learn, never originates spontaneously. It is a singular fact that short-wooled sheep, like the

Fig. 66. Fig. 67. Fig. 68.



THE ACARUS WHICH CAUSES SCAB.

Fig. 67.—The acari of their natural size on a dark ground.
Fig. 66.—The female of 366 times the natural size, larger than the male, of an oval form, and provided with eight feet, four before and four behind.
a.—The sucker.
b. b. b. b.—The four anterior feet, with their trumpet-like appendices.
c. c.—The two interior hind feet.
d. d.—The two outward feet, the extremities of which are provided with some long hairs, and on the other parts of the legs are shorter hairs. To these hairs the young ones adhere, when they first escape from the pustule.
e.—The tail, containing the anus and vulva, garnished with some short hairs.
Fig. 68.—The male on its back, and seen by the same magnifying power.
a.—The sucker.
b. b. b. b.—The fore-legs with their trumpet-like appendices, as seen in the female.
c. c.—The two hind-legs, with the same appendices and hairs.
d.—The rudiments of the abdominal feet.
e.—The tail.

Merino, are much less subject to its attacks, and this is probably *one* reason for its little comparative prevalence in the United States. Mr. Youatt observes:

"The old and unhealthy sheep are first attacked, and long-wooled sheep in preference to the short; a healthy short-wooled sheep will long bid defiance to the contagion, or probably escape it altogether."

It spreads from individual to individual and from flock to flock, not only by means of direct contact, but by the acari left on posts, stones, and other substances against which diseased sheep have rubbed themselves. Healthy sheep are therefore liable to contract the malady if turned on pastures previously occupied by scabby sheep, though some considerable time may have elapsed since the departure of the latter.

The sheep laboring under the scab is exceedingly restless. It rubs itself with violence against trees, stones, fences, &c. It scratches itself with its feet, and bites its sores and tears off its wool with its teeth. As the pustules are broken, their matter escapes, and forms scabs covering red, inflamed sores. The sores constantly extend, increasing the misery of the tortured animal. If unrelieved, he pines away and soon perishes.

I have never had an opportunity to observe the post-mortem appearances. Mr. Youatt says:

"The post-mortem appearances are very uncertain and inconclusive. There is generally chronic inflammation of the intestines, with the presence of a great number of worms. The liver is occasionally schirrous, and the spleen enlarged; and there are frequently serous effu-

sions in the belly, and sometimes in the chest. There has been evident sympathy between the digestive and the cutaneous systems."

Treatment.—About twelve years since, I purchased 150 fine-wooled sheep just driven into the county from a considerable distance. I placed them on a farm then owned by me, in another town, and did not see them for about three weeks. One of my men then reported to me that the sheep were amiss—that they were shedding off their wool—sore spots were beginning to show on them—and that they rubbed themselves against the fence-corners, &c. Though I had never seen the scab, I took it for granted that this was the disease. No time was to be lost, as I had 700 other sheep on the farm—though fortunately, thus far, the new comers had been kept entirely separate from them. Barely looking into Mr. Livingston's work for a remedy, I provided myself with an ample supply of tobacco and set out. The sheep had been shorn, and their backs were covered with scabs and sores. They evidently had the scab. I had a large potash kettle sunk partly in the ground as an extempore vat, and an unweighed quantity of tobacco put to boiling in several other kettles. The only care was to have *enough* of the decoction, as it was rapidly wasted, and to have it *strong enough*. A little spirits of turpentine was occasionally thrown on the decoction, say to every third or fourth sheep dipped. It was necessary to use it sparingly, as, not mixing with the fluid and floating on the surface, too much of it otherwise came in contact with the sheep. Not attending to this at first, two or three of the sheep are thrown into great agony, and appeared to be on the point of dying. I had each sheep caught and its *scabs scoured off*, by two men who rubbed them with stiff shoe-brushes, dipped in a suds of tobacco-water and soft soap. The two men then dipped the sheep all over in the large kettle of tobacco-water, rubbing and kneading the sore spots with their hands while immersed in the fluid. The decoction was so strong that many of the sheep appeared to be sickened either by immersion or by its fumes; and one of the men who dipped, though a tobacco-chewer, vomited, and became so sick that his place had to be supplied by another.

The effect on the sheep was almost magical! The sores rapidly healed, the sheep gained in condition, the new wool immediately started, and I never had a more perfectly healthy flock on my farm. Though administered with little reference to economy, the remedy was a decisive one.—With a vat like fig. 27, (Letter XII,) this would not necessarily be a very expensive method, with sheep recently sheared. But the assaults of the scab usually come on in the spring before shearing time, and it would require an immense quantity of the tobacco decoction to dip sheep with their fleeces on, however carefully it might be pressed out.

The following is the remedy recommended by Chancellor Livingston:

"First, I separate the sheep (for it is very infectious); I then cut off the wool as far as the skin feels hard to the finger; the scab is then washed with soap-suds, and rubbed hard with a shoe-brush, so as to cleanse and break the scab. I always keep for this use a decoction of tobacco, to which I add one-third by measure of the lye of wood ashes, as much hog's-lard as will be dissolved by the lye, a small quantity of tar from the tar-bucket, which contains grease, and about one-eighth of the whole by measure of spirits of turpentine. This liquor is rubbed upon the part infected, and spread to a little distance round it, in three washings, with an interval of three days each. I have never failed in this way to effect a cure when the disorder was only partial. . . . I cannot say whether it would cure a sheep infected so as to lose half its fleece."*

The following remedies are much used in Great Britain:

No. 1.—Dip the sheep in an infusion of arsenic, in the proportion of

* Livingston's Essay. Appendix, p. 177.

half a pound of arsenic to twelve gallons of water. The sheep should previously be washed in soap and water. The infusion must not be permitted to enter the mouth or nostrils.

No. 2.—Take common mercurial ointment, for bad cases, rub it own with three times its weight of lard—for ordinary cases, five times its weight of lard. Rub a little of this ointment into the head of the sheep. Part the wool so as to expose the skin in a line from the head to the tail, and then apply a little of the ointment with the finger the whole way. Make a similar furrow and application, on each side, four inches from the first, and so on over the whole body. The quantity of ointment (after being compounded with the lard) should not exceed two ounces, and considerably less will generally suffice. A lamb requires but one-third as much as a grown sheep. This will generally cure, but if the sheep should continue to rub itself, a lighter application of the same should be made in ten days.

No. 3.—Take of lard or palm oil 2 lbs., oil of tar ½ lb., sulphur 1 lb.—Gradually mix the last two, then rub down the compound with the first.—Apply in the same way as No. 2.

No. 4.—Take of corrosive sublimate ½ lb., white hellebore, powdered, ¾ lb., whale or other oil 6 gallons, rosin 2 lbs., tallow 2 lbs. "The first two to be mixed with a little of the oil, and the rest being melted together, the whole to be gradually mixed." This is a powerful preparation and must not be applied too freely.

Mr. Spooner gives the preference to No. 1, as least troublesome; Mr. Youatt to No. 2; and the author of the Mountain Shepherd's Manual to No. 4. I should certainly prefer No. 3, if it is, as it is asserted to be, equally effectual, for the reason that it contains no poisonous or dangerous ingredients.

An erysipelatous scab, or erysipelas, attended with considerable itching, sometimes attacks the English flocks, but I have heard of no cases of it here. This would be classified as a febrile disease. It is treated with a cooling purgative, venesection, and oil or lard applied to the sores.

—

Disease of the Biflex Canal.—From the introduction of foreign bodies into the biflex canal, or from other causes, it occasionally becomes the seat of inflammation. This is sometimes confounded with the hoof-ail, but the diseases are entirely distinct and different from each other. Inflammation of the biflex canal causes an enlargement and redness of the pastern, particularly about the external orifice of the canal. The toes are thrown wide apart by the tumor. I never have known it to attack more than one foot, and never have allowed it to go to the point of ulceration, which it is said to do if neglected. There is none of that soreness and disorganization between the back part of the toes—and none of that peculiar fetor which distinguishes the hoof-ail. I never have found it anything like so serious a disease as it is described to be by the English veterinarians.

Treatment.—I have always scarified the coronet, making one or two deeper incisions in the principal swelling around the mouth of the canal—covered the foot with tar—and paid no more attention to it.

—

Hoof-Ail.—The first symptom of this troublesome malady, which is ordinarily *noticed*, is a lameness of one or both of the fore feet. But on daily examining the feet of a flock which have the disease among them, it will be readily seen that the lesions manifest themselves for several days before they are followed with lameness. Scarcely any English writer whom I

have read, describes with respectable accuracy the first appearances of the hoof-ail as it exhibits itself *in this country, and among the fine-wooled sheep.** Mr. Youatt says:

"The foot will be found hot and tender, the horn softer than usual, and there will be enlargement about the coronet, and a slight separation of the hoof from it, with portions of the horn worn away, and ulcers formed below, and a discharge of their fetid matter. The ulcers, if neglected, continue to increase; they throw out fungous granulations, they separate the hoof more and more from the parts beneath, until at length it drops off."

The above is *not* a description of the consecutive symptoms of the hoof-ail as *I* have seen them. The hoof, instead of being softened, is perceptibly *hardened*, I think, by the presence of the disease. There is occasionally an enlargement about the coronet, but this is not common in the outset; and so far from the horn first separating from the foot at that point, it is the last place where it usually adheres when the soles are eaten away by the ulcerous matter, and the mere outside shell remains. I never have known a hoof to drop off, entire, in the sense in which I understand the closing part of Mr. Youatt's remark.

My first introduction to this disease was by its breaking out in its most malignant form in a flock of eight hundred sheep, with which I had placed, early in the preceding spring, a few valuable sheep received from abroad which were infected with the hoof-ail, without my having the slightest suspicion of the fact. The disease, when of long standing, and well kept under, shows itself but very little during the winter and spring, unless the foot is directly examined. Every sheep in that eight hundred took the disease, sometimes first in one foot, then in another, then in a third, and when the fourth one was attacked, perhaps it was again bursting out in one of the *cured feet!* I considered the sheep valuable, had much of the *esprit du corps* of a young flock-master, and was *determined* to conquer the malady at any cost and at all hazards. I have little doubt that every sheep in the flock was "doctored" on the average ten times each, and it was very rarely that I permitted *any other person than myself to cut away the horn and prepare the foot of a single sheep for the application of the remedies!* When I look back to that period—the sheep on some remote pastures—not a shed on them to shelter myself or assistants from the burning August sun as we bent ten or twelve hours a day over our task—our only "operating room" a yard in the corner of two fields—blood and pus encrusting hands and garments, and occasionally by an unlucky stroke of the knife showered over *face* and *bosom*—the crawling maggots—the intolerable fetor:—I hardly know whether to take credit to myself for or to laugh at the stanchness of my zeal. But, worst of all, with all my labor, I had

—"scotch'd the snake, not killed it!"

The disease appeared in my flock, though in a much mitigated form, the next summer. I think I then cured it—but I was not allowed to escape thus. In the succeeding summer, accident again brought it among my sheep. In a word, I have first and last served a five years' apprenticeship to combating the hoof-ail. Having seen it in every possible phase—having experimented with almost every recommended remedy not obviously empirical—I shall be excused if I speak my own opinions with a de-

* As I have before stated, when discussing "the most profitable breed for the South," the hoof of the Merino and that of the English Long-Wooled races, is essentially different. The latter usually retains its natural shape and thickness, and although the side-crust sometimes turns under, it is but a comparatively thin slip of horn, which is subsequently worn or broken off—or it is easily removed by the knife. The hoof of the Merino grows rapidly, *especially when the animal has the hoof-ail.* The horny soles will sometimes become nearly an inch thick, and the toes will elongate and turn up in front like horns, to the length of three and even four inches. The weight of the Merino is much less than that of the Long-Wool. Take these facts into consideration, together with some of the other circumstances detailed in the introductory remarks to Letter XIV, and perhaps it sufficiently accounts for some differences in the diagnosis of the disease between the two countries.

gree of confidence, even if they chance to conflict with those of professed and eminent veterinarians.

As all are aware, the horny covering of the sheep's foot extends up, gradually thinning out, some way between the toes or divisions of the hoof, and above these horny walls the "cleft" is lined with skin. When the points of the toes are spread apart, this skin is shown in front, covered with short, soft hair. The back part of the toes, or the "heels," can be separated only to a little distance, and the skin in the cleft above them is naked. In a healthy foot, the skin throughout the whole cleft is as firm, sound, *dry* and uneroded, as on any other part of the animal.

The first symptom of hoof-ail is a slight erosion, accompanied with inflammation and heat of the naked skin in the *back part* of the cleft, immediately above the heels. The skin assumes a *macerated* appearance, and is kept moist by the presence of a sanious discharge from the ulcerated surface. As the inflammation extends, the friction of the parts causes pain and the sheep limps. At this stage the foot *externally*, in a great majority of cases, exhibits not the least trace of disease, with the exception of a slight redness, and sometimes the appearance of a small sore at the upper edge of the cleft, when viewed from behind.

The ulceration of the surface rapidly extends. The thin upper edges of the inner walls of the hoof are disorganized, and an ulceration is established between the hoof and the fleshy sole. A purulent fetid matter is exuded from the cavity. The extent of the separation daily increases, and the ulcers also form sinuses deep into the fleshy sole. The bottom of the hoof disappears, eaten away by the acrid matter, and the outer walls, entirely separated from the flesh, hang only by their attachments at the coronet. The whole fleshy sole is now entirely disorganized, and the entire foot is a mass of black, putrid ulceration; or, as it more commonly happens, the fly has struck it, and a dense mass of writhing maggots cover the surface, and burrow in every cavity. The fore-feet are generally first attacked, and most usually but one of them. The animal at first manifests but little constitutional disturbance. It eats as usual. By the time that any considerable disorganization of the structures has taken place in the first foot—sometimes sooner—the other fore-foot is attacked. That becoming as lame as the first, the miserable animal seeks its food on its knees, and if forced to rise, its strange, hobbling gait betrays the intense agony occasioned by bringing its feet in contact with the ground. There is a bare spot under the brisket of the size of the palm of a man's hand, which looks red and inflamed. There is a degree of general fever—and the appetite is dull. The animal rapidly loses condition. The appearance of the maggot soon closes the scene. Where the rotten foot is brought in contact with the side in lying down, the filthy ulcerous matter adheres to and saturates the short wool, (it being but a month and a half or two months after shearing,) and maggots are either carried there by the foot, or they are soon generated there. A black crust is soon formed round the spot. It is the decomposition of the surrounding structures, and innumerable maggots are at work below, burrowing into the integuments and muscles and eating up the miserable animal alive. The black festering mass rapidly spreads, and the poor sufferer perishes, we cannot suppose otherwise than in tortures the most excruciating.

Sometimes but one fore-foot is attacked, and subsequently one or both hind ones. There is no uniformity in this particular, and it is a singular fact that when two or even three of the feet are dreadfully diseased, the fourth may be entirely sound. So also one foot may be cured, while every other one is laboring under the malady.

The highly offensive odor of the ulcerated feet is so peculiar that it is strictly pathognomonic of the disease—and would reveal its character to one familiar with it, in the darkest night.

When the disease has been well kept under during the first season of its attack, but not entirely eradicated, it will almost or entirely disappear as cold weather approaches, and does not manifest itself until the warm weather of the succeeding summer. It then assumes a mitigated form—the sheep are not rapidly and simultaneously attacked—there seems to be less inflammatory action, constitutionally, and in the diseased parts—the course of the disease is less malignant and more tardy, and it more readily yields to treatment. If well kept under the second summer, it is still milder the third. A sheep will occasionally be seen to limp, but its condition will scarcely be affected, and dangerous symptoms will rarely supervene. One or two applications made during the summer, in such a way, as I shall presently describe, that one thousand sheep can be submitted to the treatment in half a day—with but a trifle of labor and expense—will now suffice to keep the disease under. At this point a little vigor in the treatment will entirely extinguish the disease.

With all its fearful array of symptoms, can the hoof-ail be cured in its *first* attack on a flock? The worst case can be promptly cured, as I know by repeated experiments. Take a single sheep, put it by itself, and administer the remedies *daily* after the English fashion, or as I shall presently prescribe, and there is not an ovine disease which more *surely* yields to treatment. But as already remarked, in a preceding Letter, in this country, where sheep are so cheap, and labor in the summer months so dear, it would out of the question for an extensive flock-master to attempt to keep each sheep by itself, or to make a *daily* application of remedies. There is not a flock-master within my knowledge who has ever pretended to apply his remedies oftener than once a week, or *regularly* as often as that, and not one in ten makes any separation between the diseased and healthy sheep of a flock into which the malady has been once introduced. The consequence necessarily is that though you may cure the sheep *now diseased*, it has infected or inoculated others—and these in turn scatter the contagion, before they are cured. There is not a particle of doubt—nay, I know, by repeated observation, that a sheep once entirely cured may again contract the disease, and thus the malady perform as a perpetual circle in the flock. Fortunately, however, the susceptibility to contract the disease diminishes, according to my observation, with every succeeding attack; and fortunately also, as already stated, succeeding attacks, *cæteris paribus*, become less and less virulent.

What course shall then be pursued? Shall the flock-master sacrifice his sheep—shall he take the ordinary half-way course—or shall he expend more on the sheep than they are worth in attempting to cure them? Neither. The course I would advise him to pursue, will appear as I detail the experiments I have made.

Treatment.—The *preparation of the foot*, where any separate individual treatment is resolved upon—and this is always necessary, at least in bad cases—is a subject of no dispute. But the labor can be prodigiously economized by attention to a few not very commonly observed particulars. Sheep should be yarded for the operation immediately after a rain, if practicable, as then the hoofs can be readily cut. In a dry time, and after a night which has left no dew on the grass, their hoofs are almost as tough as horn. They must be driven through no mud, or soft dung, on their way to the yard, which would double the labor of cleaning their feet.—The yard must be small, so they can be easily caught, and it must be kept

well littered down, so they shall not fill their feet with their own excrement. If the straw is wetted, their hoofs will not of course dry and harden as rapidly as in dry straw. Could the yard be built over a shallow, gravelly-bottomed brook,* it would be an admirable arrangement. The hoofs would be kept so soft that the greatest and most unpleasant part of the labor, as ordinarily performed, would be in a great measure saved, and they would be kept free from that dung which by any other arrangement will, more or less, get into their clefts.

The principal operator or foreman seats himself in a chair—a couple of good knives, a whetstone, the powerful toe-nippers (fig. 21, Letter XII,) a bucket of water with a couple of linen rags in it, and such medicines as he chooses to employ, within his reach. The assistant catches a sheep and lays it partly on its back and rump, between the legs of the foreman, the head coming up about to his middle. The assistant then kneels on some straw or seats himself on a low stool at the hinder extremity of the sheep. If the hoofs are long, and especially if they are dry and tough, the assistant presents each foot to the foreman, who shortens the hoof with the toe-nippers. If there is any filth between the toes, each man takes his rag from the bucket of water, and draws it between the toes and rinses it, until the filth is removed. Each then seize their knives, and the process of paring away the horn commences. And *on the effectual performance of this, all else depends.* A glance at the foot will show whether it is the seat of the diseased action. The least experience cannot fail in properly settling this question. An experienced *finger*, placed on the back of the pastern close above the heel, would at once detect the local inflammation (by its heat) *in the dark.*

If the disease is in the first stage—*i. e.* there is merely an erosion and ulceration of the cuticle and flesh in the cleft *above* the walls of the hoof, no paring is *necessary.* But if ulceration has established itself between the hoof and the fleshy sole, the ulcerated parts, be they more or less extensive, MUST BE ENTIRELY DENUDED OF THEIR HORNY COVERING, cost what it may of time and care. It is better not to wound the sole so as to cause it to bleed freely, as the running blood will wash off the subsequent application, but no fear of wounding the sole must prevent a full compliance with the rule above laid down. At the worst, the blood will stop flowing after a little while, during which time no application need be made to the foot.

If the foot is in the third stage—a mass of rottenness and filled with maggots—in the first place pour a little spirits of turpentine (a bottle of it, with a quill through the cork, should be always ready,) on the maggots and most of them will immediately decamp, and the others can be removed with a probe or small stick. Then *remove every particle of loose horn, though it should take the entire hoof*—and it *will* generally take the whole hoof in such cases. The foot should be now cleansed with a solution of chloride of lime, in the proportion of one pound of chloride to one gallon of water. If this is not at hand, plunging the foot repeatedly in water, just short of scalding hot, will answer every purpose. The great object is to clean the foot *thoroughly.* If there are any considerable fungous granulations, (" proud-flesh,") they should be excised with a pair of scissors, or the actual cautery (hot iron.)

And now comes the important question *what constitutes the best remedy?* The recommended prescriptions are innumerable. The following are some of the most popular ones.† 1. 4 oz. blue vitriol, 2 oz. of verdigris,

* A portion of any little brook might be prepared by *planking* the bottom, and widening it if desirable.
† The first three are given in the American Shepherd, pp. 379-80.

to a junk-bottle of wine. 2. Spirits turpentine, tar and verdigris in equal parts. 3. 3 quarts of alcohol, 1 pint spirits of turpentine, 1 pint of strong vinegar, 1 lb. blue vitriol, 1 lb. copperas, 1½ lbs. verdigris, 1 lb. alum, 1 lb. of saltpetre, pounded fine: mix in a close bottle, shake every day, and let it stand six or eight days before using: also mix 2 pounds of honey and 2 quarts of tar, which must be applied after the previous compound. "Two applications will entirely remove the disease," says this recipe, which was once, I believe, hawked about the country as a patent cure—being sold at five dollars to each purchaser, he giving a promise of inviolable secrecy! 4. Apply diluted aquafortis (nitric acid) with a feather to the ulcerated surface. 5. Apply diluted oil of vitriol (sulphuric acid) in the same way. 6. Same of muriatic acid. 7. Dip the foot in tar nearly at the boiling point, &c.

After a thorough trial of the above and a multitude of other prescriptions,* I have come to the conclusion that in the first and second stages of the disease—before the ulcers have formed sinuses into the sole, and wholly or partly destroyed its structure—that no application, simple or compound, is preferable to a saturated solution of blue vitriol, (sulphate of copper.) In my judgment, no beneficial addition can be made to it as a remedy. Of the manner of applying it I shall speak presently.

In the third stage, when the foot is a festering mass of corruption, after it has been cleansed as already directed, it requires some strong caustic to remove the unhealthy granulations—the dead muscular structures—and to restore healthy action. Lunar caustic I think preferable to any other application, but it is too expensive. Mr. Youatt gives a decided preference to chloride of antimony, and I think him correct. This is frequently not attainable in the country drug-stores, and muriatic acid may be resorted to, or even nitric or sulphuric acid. The diseased surface is touched with the caustic (applied with a swab formed by fastening a little tow on the end of a stick,) until the objects above pointed out are obtained. I have then usually treated the foot with the solution of blue vitriol, and subsequently coated it over with tar which has been boiled, and is properly cooled. The last protects the raw wound from dirt, flies, &c. Sheep in this stage of the disease should certainly be separated from the main flock, and looked to as often as once in three days. With this degree of attention, their cure will be rapid, and it is astonishing with what celerity the obliterated structures of the foot will be restored.

The ordinary method of using the solution of blue vitriol is to pour it from a bottle with a quill in the cork, into the foot, when the animal lies on its back between the operators, as already described. In this way a few cents' worth of vitriol will serve for a large number of sheep. But the method is imperfect, because, without remarkable care, there will almost always be some slight ulcerations not uncovered by the knife—the passages to them will be devious, and perhaps nearly or quite closed—and the solution will not reach them. Thus the disease will only be temporarily suppressed, not cured.

I had a flock of sheep a few years since which were in the second season of the disease. They had been but little looked to during the summer, and as cold weather was setting in, many of them were considerably lame—some of them quite so. The snow fell and they were brought into the yards, limping and hobbling about deplorably. This sight, so disgraceful to me as a farmer, roused me into activity. I bought a quantity

*Many of them resorted to "against the stomach of my sense," to give myself and others indisputable ocular proof of their inutility—or that they were no better than cheaper, simpler, and more easily attainable medicines.

of blue vitriol—made the necessary arrangements—and once more took the chair as principal operator! Never were the feet of a flock more thoroughly pared. Into a large washing tub, in which two sheep could stand conveniently, I poured a saturated solution of blue vitriol and water, *as hot as could be endured by the hand even for a moment.* The liquid was about four inches deep on the bottom of the tub, and was kept at about that depth by frequent additions of *hot* solution. As soon as a sheep's feet were pared, it was placed in the tub and held there by the neck, by an assistant. A second one was prepared and placed beside it. When the third one was ready, the *first* was taken out, and so on. Two sheep were thus constantly in the tub, and each remained in it about five minutes.—The cure was *perfect!* There was not a lame sheep in the flock during the winter or the next summer! The hot liquid penetrated to every cavity of the foot, and doubtless had a far more decisive effect *even on the uncovered ulcers,* than would have been produced by merely wetting them. Perhaps the lateness of the season was also favorable, as in cold weather the ulcers of ordinary virulence discharge no matter to inoculate the healthy feet, and thus, at the time of applying the remedy, there are no cases where there has been inoculation not yet followed by those lesions which admit of cure. *Whether so thorough a soaking would destroy the virus in the inoculated foot,* I cannot pretend to decide.

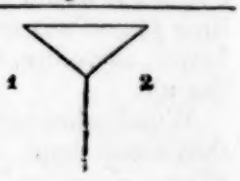
I think that the vitriol required for the above one hundred sheep was about twelve pounds, and that it cost me fifteen cents per pound. The account then would stand thus:

12 lbs. of vitriol at 15 cents	$1,80
Labor of 3 men one day each	2,25
Total	$4,05

or about *four cents* per sheep. I have not a doubt that three such applications at intervals of a week, would effectually cure the disease, as every new case would be arrested and cured before it had time to inoculate others. I have no doubt that it would do this at any time of year, and even during the first and most malignant prevalence of the contagion, PROVIDING THE PARING WAS SUFFICIENTLY THOROUGH. The second and third parings would be a mere trifle, and the liquid left at the first and second applications could again be used. Thus sheep could be cured at about twelve cents per head. This is vastly cheaper in the long run than the ordinary temporizing method—where people count the cost of a few pounds of blue vitriol, but not their time, and who thus keep the disease lingering in their flocks for years. Indeed, if partial and temporizing treatment is all that is aimed at,—if the flockmaster is content to simply keep the disease under—I can point out methods quite as efficacious as the common one by paring and applying washes from a bottle—*as ordinarily performed*—and not costing a tithe as much.

Between the corners of two sheep-pastures (1, 2, of fig. 69,) construct the dividing fence as represented in the cut. A narrow passage is thus left from one field to another. This passage should be about 2 or 2½ feet wide and 12 feet long. The fence on each side of the passage should be an upright board fence, so that the space can be entirely filled on the bottom with a flat trough, (the bottom formed of a plank) with side and end boards about five inches high. In this trough place say a bushel and a half or two bushels of un-

Fig. 69.



slacked lime,* slack it, and then fill the trough nearly full of water.—Through this drive the flock several times from one field to the other—until the lame ones manifest much suffering. Repeat this once a week the first summer that the disease appears, putting in fresh lime each time.—This does not appear to *cure* the hoof-ail, but it keeps it under; the sheep keep their condition, and show little lameness. The second or third summer of the disease, three or four such applications usually answer for the entire season. Some use dry slacked lime, as the same trough-full will then answer for several applications. The trough in this case must have a roof over it. I never have tried the last method. If the dry lime will get sufficiently between the toes—and it is said to—it will answer the purpose where it touches more effectually than even the liquid, but it would not be so likely to penetrate into cavities. Some who use the lime remedy, pare the feet once pretty thoroughly prior to the first application, but afterward neglect them. Others neglect paring entirely, *i. e.* beyond shortening the toes once a year, as is practiced with all fine-wooled flocks.

Fig. 70.

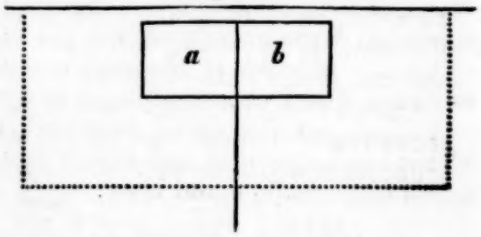


Fig. 70 is an improvement on the more common arrangement exhibited in fig. 69. The dotted lines enclose good-sized yards in the corners of two adjoining pastures.—Two drivers can yard the sheep in one of these, and drive the sheep from one to the other any number of times, without chasing them about a large field. The labor can therefore be performed much more rapidly, and it requires less force. A couple of active fellows would yard and submit a flock of two or three hundred sheep to the process in less than an hour. When the sheep are first yarded, if there are any very lame ones, draw them out and place them in one of the small pens (*a*, *b*.) Their feet can be examined, and if necessary a little extra pains taken with them, by paring, cauterizing, etc. Each sheep as treated is put into the other small pen, where it can be retained until the flock is discharged, and then removed to a separate pasture from the others, if considered desirable.

Where two yards are constructed, as in fig. 70, it is obvious that the arrangement can be made elsewhere as well as in the corner of two fields, though if the sheep are wild, it may require a few rods of wing fence (in the place of the dividing one between the fields, as seen in figures 69 and 70,) for the more convenient *cornering* of the sheep to yard them. Thus one such apparatus might be made to conveniently answer for a whole farm, though thousands of diseased sheep were scattered in different flocks over it, and may be placed at a spot where water, etc. are convenient.

Where lime and water are used, the sheep must be driven through the trough slowly and quietly—as otherwise the lime will be scattered over their wool, into their eyes, &c. If the lime is fresh burned and highly caustic, it would be likely to destroy their eyes. Indeed, pure fresh-burned lime sometimes will take the hair off from their pasterns and shanks. It is better, therefore, to use it when somewhat re-carbonized by exposure to the air.

Wood ashes are said to produce the same effect with lime. It is claimed that sheep kept on lands where the timber has been recently burned, ("new clearings,") will recover from the hoof-ail. *Query:* If this be true

* To be added to, from time to time, if the number of sheep run through is large enough to waste it materially, before they are sufficiently treated.

might not the lye of ashes, of the proper strength, make an adequate substitute for lime and water?

Some Northern farmers drive their sheep over dusty roads as a *remedy* for *hoof-ail!* Opposed as it would seem to be to sound theory—sadly as it is at variance with the practice of foreign veterinarians who employ "tow-pledgets," "gaiter boots," etc., to exclude all dirt from the diseased surface, it does actually seem in cases of ordinary virulence—especially where the disease is chronic—to *dry up the ulcers and keep the malady under!*

There is an important point to be regarded in exhibiting remedies for the hoof-ail, the mention of which I have reserved until now, as it concerns *all remedies equally.* Many farmers select rainy weather to "doctor" the sheep. Their feet are then soft, and it is therefore on all accounts good economy, when the feet are to be pared, and each separately treated, *provided* they can be kept in sheep-houses, or under shelters of any kind, until the rain is over and the grass again dry. If immediately let out in wet grass of any length, the vitriol or other application is measurably washed away. This is avoided by many, by dipping the feet in warm tar—an excellent plan under such circumstances. The tar is probably a good application at any time, but I do not consider it necessary, in ordinary cases, unless the sheep must be turned out into wet grass.

A flock of sheep which have been cured of the hoof-ail, are considered more valuable than one which has never had it. They are far less liable to contract the disease from any casual exposure—and its ravages are far less violent and general among them.

I am strongly disposed to believe that hoof-ail is propagated in this country only by *inoculation*—the contact of the matter of a diseased foot with the integuments lining the bifurcation of a healthy foot. That it is propagated in some of those ways classed under the ordinary designation of *contagion* is certain. I could indisputably authenticate more than a hundred cases, where the sheep on a farm, indeed through a neighborhood, had been notoriously exempt from hoof-ail from the first settlement of the country—so that the inhabitants did not even know what the disease was—until some diseased flock was introduced from abroad. It was so in the region where I live, and I well recollect when a flock of Saxons, driven from a neighboring county, first introduced it among our sheep. There has not been a diseased flock in the county which could not trace it back to that flock. And the contagion was spread by them as readily on our dry hill-farms as on low and moist ones.

That it may be propagated by *inoculation* I *know* by direct experiment. I have placed the matter of diseased feet on the skin lining the cleft of a healthy foot under a variety of circumstances—sometimes when that skin was in its ordinary and natural state—sometimes after a very slight scarification—sometimes when macerated by moisture. The disease has been communicated under each of these circumstances, and in a majority of all the instances, amounting to sixteen or seventeen.

That there is not even a supposed or pretended case, to my knowledge, on record where the disease has originated spontaneously, in the Northern States, I have already asserted.* I regard Professor Dick's statements of the manner in which the disease originates, which I have quoted,† as wholly inapplicable to *our country with its present breeds of sheep*, and I cannot sufficiently express my surprise that this eminent veterinarian should nave adopted—what I deem so unqualified an absurdity—the non-contagion theory.

I have been disposed to trace the propagation of the disease exclusive-

*In the beginning of Letter XIV. †Ib.

ly to *inoculation*, from having observed on my own farm and elsewhere, that healthy flocks have occupied with impunity fields adjoining those occupied by diseased ones—an open board or rail fence only separating them. I have drawn the same inference also from the manner in which the disease attacks flocks. The whole, or any considerable number, though sometimes rapidly, are never *simultaneously* attacked, as we should expect among animals so gregarious, if the disease could be communicated by simple contact, inhaling the breath or other effluvium. But not having positive and demonstrative proof of the correctness of the proposition, I would advise no man to incur any risks, unnecessarily, founded on this assumption, without first *satisfying himself* on the point.

The matter of diseased feet is left on grass, straw, and other substances, and thus is brought in contact with the inner surfaces of healthy feet.—Sheep therefore contract the disease from being driven over the pastures, yarded on the straw, &c., where diseased sheep have been, perhaps even days before. The matter would probably continue to inoculate until dried up by the air and heat, or washed away by the rains. The stiff upright stems of closely mown grass (as on meadows,) are almost as well calculated to receive the matter of diseased feet, and deposit it in the clefts of healthy ones, as any means which could be devised artificially. I do not consider it *entirely safe* to drive healthy sheep over *roads*, and especially into *washing-yards* or *sheep-houses*, where diseased sheep have been, until rain has fallen, or time has elapsed for the matter to dry up. On the moist bottom of a washing-yard, and particularly in houses or sheds, kept from sun and wind, and rain, this matter might be preserved for some time in a condition to inoculate.

—

Foul.—Sheep are much less subject to this disease than cattle, but are subject to it if kept in wet, filthy yards, or on moist, poachy ground. It is an irritation of the integument in the cleft of the foot, slightly resembles incipient hoof-ail, and produces lameness. But it produces no serious structural disorganization—disappears without treatment—is not contagious—and appears in the wet weather of spring and fall, instead of the dry, hot period of summer when the hoof-ail rages most. A little solution of blue vitriol, or a little spirits of turpentine, either followed by a coating of warm tar, promptly cures it.

—

Goitre or Bronchocele.—I never have seen this classed among the diseases of sheep, but the "swelled neck" in lambs is, like the goitre, an enlargement of the thyroid glands, and it is strikingly analogous to, if not identical with, that disease. It is congenital. The glands at birth are from the size of a pigeon's to that of a hen's egg—though more elongated and flattened than an egg in their form. The lamb is exceedingly feeble, and often perishes almost without an effort to suck. Many even make no effort to rise, and die as soon as they are dropped. It is rare that one lives—though three or four years since, a lamb in my flock having *one* of the thyroid glands enlarged, grew up a large, healthy sheep. At a year old, when disposed of, the enlarged gland was of the size of a goose-egg.

No inconsiderable number of lambs annually perish from this disease.—It does not appear to be an epizoötic, though I think it more prevalent some seasons than others. It does not seem to depend upon the water, or any other natural circumstances of a region, (as goitre is usually supposed to,) as it may not prevail in the same flock or on the same farm once in ten years. I never have been able to trace it to any particular kind of food. That when it does appear, it is induced by some common local or

alimentary cause, I am induced to infer from the fact that its attacks are rarely isolated. When there are any instances of it in a flock, there are usually a number of them. I have lost lambs by it two seasons—from six to ten per cent. of the whole number. Francis Rotch, Esq. of Louisville, Otsego county, lost a much heavier per centage than this (my impression would now be nearly *fifty* per cent.) of his choice South-Down lambs, a few years since. I am acquainted with various other instances where the loss has ranged from ten to twenty per centum.

When congenital goitre has thus appeared among my lambs, the ewes *have been in unusually high condition.* The same was true of Mr. Rotch's ewes, as he wrote me at the time. Whether this coëxistence implies causality, I do not pretend to decide. High condition in the ewe *may* be *one* of the inducing causes.

Treatment.—I know of no treatment which will reach the case. Indeed, the lamb is dying, almost, when born—and remedies are out of the question. Should one having the disease chance to live, it would scarcely be worth while to attempt reducing the enlargements of the glands. Perhaps keeping the breeding ewes uniformly in fair, plump, but not *high* condition, would be as effectual a preventive as any.

MISCELLANEOUS DISEASES.

Poison from Eating Laurel.—I often hear of this from our drovers, who take sheep in the spring to the Philadelphia and New-Jersey markets, through Northern Pennsylvania, on the Old Red Sandstone formation of which the beautiful *Kalmia angustifolia* is abundant. The following description of the effects on the sheep of eating this plant, and the proper remedial treatment, though, I confess, not very *satisfactory* to *me*, I extract entire from the "American Shepherd,"* as I have no experience whatever in the premises, and no better account within my reach :

"Sheep and calves will often, in the winter or spring of the year, eat greedily of the low Laurel (*Kalmia angustifolia*). The animal appears to be dull and stupid, swells a little, and is constantly gulping up a greenish fluid which it swallows down; a part of it will trickle out of its mouth, and discolor its lips. The plant probably brings on a fermentation in the stomach, and Nature endeavors to throw off the poison herb by retching or vomiting.

Treatment.—In the early stages, if the greenish fluid be suffered to escape from the stomach, the animal most generally recovers. To effect this, gag the sheep, which may be done in this manner : Take a stick of the size of your wrist and six inches long—place it in the animal's mouth—tie a string to one end of it, pass it over the head and down to the other end, and there make it fast. The fluid will then run from the mouth as fast as thrown up from the stomach. In addition to this, give roasted onions and sweetened milk freely."

I have somewhere, I think, seen drenches of milk and castor-oil prescribed for sheep poisoned with laurel; and I should, without farther knowledge of the subject, consider it treatment promising better results than the preceding.

Sore Face.—Sheep feeding on pastures infested with John's wort (*Hypericum perforatum*) not unfrequently exhibit an irritation of the skin about the nose and face, which causes the hair to drop off from the parts. The irritation sometimes extends over the whole body, though no such case has fallen under my observation. Mr. Morrel says :† "If eaten in too large quantities, it produces violent inflammation of the bowels, and is frequently fatal to lambs, and sometimes to adults."

Treatment.—Rub a little sulphur and lard on the irritated surface. If there are symptoms of inflammation of the bowels, Mr. Morrell prescribes

* American Shepherd, p. 361. † Ib. 374.

tar—"putting it into the mouth of the sheep with a flattened stick." Abundance of salt is considered, and probably truly, a preventive. I have a sheep pasture considerably infested with this difficultly exterminated weed, and I do not recollect an instance of a sheep exhibiting the effects of eating it, in several years. It is certain that my sheep have plenty of salt, whether this is the preventive or not.

—

Sore Mouth.—The lips of sheep sometimes become suddenly sore in the winter, and swell to the thickness of a man's hand. The malady occasionally attacks whole flocks, and becomes quite fatal. No cases of it having been brought under my observation, I am unable to state whether, in accordance with the popular description, the lesions are confined to the lips. I should *presume not*. It is usually attributed to noxious weeds cut with the hay.

Treatment.—Mr. Morrell states that he has had the disease in his flock, and has cured it immediately by smearing the diseased lips with tar.*

—

Loss of Cud.—The "loss of the cud" ranks as an important disease in the nosology of the "Cattle Doctor," and frequently calls forth all the skill of that functionary to manufacture a *new cud*, which is placed in the mouth of the animal as a *substitute for the one which was lost!* That person must be little versed in the physiology of ruminants who needs to be told that the accidental loss of one of the cuds, in the process of remastication, would be a matter of no sort of consequence. The sheep, as well as the cow, not unfrequently nearly or entirely *ceases to ruminate*, but this is the *result*, not the *cause*, of disease. It is diagnostic of all important diseases, and when observed, its warning should never go unheeded.

—

Hoove.—This is not common, to any dangerous degree, among sheep, but if turned upon clover when their stomachs are empty, it will sometimes ensue. It is a distention of the paunch by gas extricated from the fermentation of its vegetable contents, and evolved more rapidly, or in larger quantities, than can be neutralized by the natural alkaline secretions of the stomach. When the distention is great, the blood is prevented from circulating in the vessels of the rumen, and is determined to the head. The diaphragm is mechanically obstructed from making its ordinary contractions, and respiration, therefore, becomes difficult and imperfect. Death soon supervenes. In ordinary cases, gentle but prolonged driving will effect a cure. Where the animal appears swelled almost to bursting, and is disinclined to move, it is better to at once open the paunch. At the most protuberant point of the swelling, on the left side, a little below the hip bone, plunge a trochar or knife, sharp at the point and dull on the edge, into the stomach. The gas will rapidly escape, carrying with it some of the liquid and solid contents of the stomach. If no measures are taken to prevent it, the peristaltic motion, as well as the collapse of the stomach, will soon cause the orifices through the abdomen and paunch not to coincide, and thus portions of the contents of the former will escape into the cavity of the latter. However perfect the cure of hoove, these substances in the belly will ultimately produce fatal irritation. To prevent this, a canula or little tube should be inserted through both orifices as soon as the puncture is made. Where the case is not imminent, alkalies have been sometimes successfully administered, which combine

* American Shepherd, p. 375.

with the carbonic acid gas, and thus at once reduce its volume. A flexible probang—or, in default of it, a rattan or grape-vine—with a knob on the end, may be gently forced down the gullet, and thus the gas permitted to escape.

—

Obstruction of the Gullet, or "Choking."—After pouring a little oil in the throat, the obstructing substance can be frequently moved up or down by external manipulation. If not, it may usually be forced down with a flexible rod, the head of which is guarded by a knob or a little bag of flax-seed. The latter having been dipped in hot water for a minute or two, is partly converted into mucilage, which constantly exudes through the cloth, and protects the œsophagus from laceration. But little force must be used, and the whole operation conducted with the utmost care and gentleness, or the œsophagus will be so far lacerated as to produce death, although the obstruction is removed.

—

Fractures.—Of these Mr. Blacklock concisely says:

"If there be no wound of the soft parts, the bone being simply broken, the treatment is extremely easy. Apply a piece of wet leather, taking care to ease the limb when swelling supervenes. When the swelling is considerable, and fever present, you can do no better than open a vein of the head or neck, allowing a quantity of blood to escape, proportioned to the size and condition of the animal, and the urgency of the symptoms. Purgatives in such cases should never be neglected. Epsom salts, in ounce doses, given either as a gruel or a drench, will be found to answer the purpose well. If the broken bones are kept steady, the cure will be complete in from three to four weeks, the process of reunion always proceeding faster in a young than in an old sheep. Should the soft parts be injured to any extent, or the ends of the bone protruding, recovery is very uncertain, and it will become a question whether it would not be better at once to convert the animal into mutton."

TREATMENT.

Method of Administering Medicine into the Stomach.—The stomach into which we wish to administer medicines, is the fourth, or digesting stomach. The comparatively insensible walls of the rumen are but slightly acted upon, excepting by doses of very improper magnitude. For the reasons given when the course of the food through the stomachs was described, medicine to reach the fourth stomach should be given in a state as near approaching fluidity as may be. And even then it may be given in such a *manner* as to defeat our object. Mr. Youatt says:

"If the animal forcibly gulps fluids down, or if they are given hastily and bodily by the medical attendant, they will fall on the canal at the base of the gullet with considerable momentum, and force asunder the pillars and enter the rumen; if they are drank more slowly, or administered gently, they will trickle down the throat and glide over these pillars, and pass on through the maniplus to the true stomach."

—

Method of Bleeding.—Bleeding from the ears or tail, as is commonly practised, rarely extracts a quantity of blood sufficient to do any good where bleeding is indicated. To bleed from the eye-vein, the point of a knife is usually inserted near the lower extremity of the pouch below the eye, pressed down, and then a cut made inward toward the middle of the face. Daubenton recommends bleeding from the angular or cheek vein,

"——— in the lower part of the cheek, at the spot where the root of the fourth tooth is placed, which is the thickest part of the cheek, and is marked on the external surface of the bone of the upper jaw by a tubercle, sufficiently prominent to be very sensible to the finger when the skin of the cheek is touched. This tubercle is a certain index to the angular vein which is placed below. . . . . The shepherd takes the sheep between his legs; his left hand more advanced than his right, which he places under the head, and grasps

the under jaw near to the hinder extremity, in order to press the angular vein, which passes in that place, to make it swell; he touches the right cheek at the spot nearly equidistant from the eye and mouth, and there finds the tubercle which is to guide him, and also feels the angular vein swelled below this tubercle; he then makes the incision from below upward, half a finger's breadth below the middle of the tubercle."

When the vein is no longer pressed upon, the bleeding will ordinarily cease. If not, a pin may be passed through the lips of the orifice, and a lock of wool tied round them

For thorough bleeding, the jugular vein is generally to be preferred. The sheep should be firmly held by the head by an assistant, and the body confined between his knees, with its rump against a wall. Some of the wool is then cut away from the middle of the neck over the jugular vein, and a ligature, brought in contact with the neck by opening the wool, is tied around it below the shorn spot near the shoulder. The vein will soon rise. The orifice may be secured, after bleeding, as described in the preceding method.

As once before remarked, the good effects of bleeding depend almost as much on the *rapidity* with which the blood is abstracted, as on the *amount* taken. This is especially true in acute disorders. Blacklock tersely remarks: "*Either bleed rapidly or bleed not at all.*" The orifice in the vein, therefore, should be of some length, and I need not inform the least experienced practitioner that it should be made lengthwise with the vein. A lancet is by far the best implement, and even a short-pointed penknife is preferable to the bungling fleam.

Another important rule in venesection is that, where indicated at all, it should always be resorted to as nearly as possible to the *commencement* of the malady.

The amount of blood drawn should never be determined by *admeasurement*, but by constitutional effect—the lowering of the pulse, and indications of weakness. In urgent cases as, for example, apoplexy or cerebral inflammation, it would be proper to bleed until the sheep staggers or falls.

The amount of blood in the sheep is less, in comparison, than that in the horse or ox. The blood of the horse constitutes about one-eighteenth part of his weight, that of the ox at least one-twentieth, while the sheep, in ordinary condition, is one-twenty-second. For this reason, we should be more cautious in bleeding the latter, especially in frequently resorting to it. Otherwise, the vital powers will be rapidly and fatally prostrated. Many a sheep is destroyed by bleeding freely in disorders not requiring it, and in disorders which *did* require it at the commencement, but of which the inflammatory stage has passed.

The Place of Feeling the Pulse.—The number of pulsations can be determined by feeling the heart beat on the left side. The femoral artery passes in an oblique direction across the inside of the thigh, and about the middle of the thigh its pulsations and the character of the pulse can be most readily noted. The pulsations per minute in a healthy adult sheep are set down by Gasparin at 65, by Youatt at 70, and by Hurtrel d'Arboval at 75. My own observations accord most nearly with those of Gasparin.

LIST OF MEDICINES EMPLOYED IN TREATING THE DISEASES OF SHEEP.

Ale.—In cases of debility, unaccompanied with fever, a small amount of ale is sometimes found a good stimulant. It may be given to feeble

sheep which have become unable to stand from having been too long cast —especially if they have laid on the snow, or on damp cold ground. It is sometimes given in addition to other medicine, in the place of the ordinary stimulants.

ALOES—Are occasionally used as a purgative in sheep medicine by farmers, but their use is justly condemned by all veterinarians.

ALUM—Used as an astringent, but is inferior to many others.

ANTIMONY *(The chloride or butyr of)*—the best caustic to remove fungous granulations, dead muscular structures, etc., in the last and worst stage of hoof-ail—applied with a swab or feather.

ARSENIC—Employed in the proportion of half a pound to twelve gallons of water, to cure scab. An infusion of it is also used to kill ticks, &c. From its liability to adhere to vessels, or to come in contact with substances which may be subsequently eaten, it is a dangerous remedy, and one which I would never have employed on my farm.

BLUE-VITRIOL *(Sulphate of Copper)*—Used internally as a strong tonic, but inferior to others. Dissolved in hot water, and applied to morbid sores, an astringent, alterative, and mild caustic, of the most admirable character. It is superior to all other applications in ordinary cases of hoof-ail.

CAMPHOR—Used with oil as an external stimulant on swellings, &c.

CARRAWAY-SEEDS—Given favorably in doses of two or three drachms, as a stomachic with other medicines.

CATECHU—A valuable astringent, in doses of half a drachm. It is one of the ingredients of the celebrated "sheep's cordial," spoken of under the head of "diarrhea."

CHALK, *Prepared*, by its alkaline properties, neutralizes the acidity of the stomach, and thus checks diarrhea. It is a very valuable remedy in doses from half an ounce to an ounce, exhibited as directed under the head of "diarrhea."

CORROSIVE SUBLIMATE *(Bi-chloride of Mercury)*—The most convenient form in which mercury can be exhibited internally. The *proto-chloride*, or calomel, from its great gravity, could not, with any certainty, be made to reach the fourth stomach. It would seem that mercury should be a useful remedy in several of the diseases of sheep. I have administered it only in the cases specified under the head of "malignant epizoötic catarrh," and then apparently with some benefit. It would be well if a series of careful experiments could be instituted of its value in the appropriate ovine diseases. It is very little used by veterinariaus, in this country or Europe. A solution of corrosive sublimate is used for the destruction of ticks, &c., and sometimes as a wash in the scab, but its use for these purposes is liable to the same objections with that of arsenic.

DIGITALIS *(Foxglove)*—A sedative employed in most of the fever medicines of the English veterinarians. Dose, one scruple.

EPSOM SALTS *(Sulphate of Magnesia)*—In doses from half an ounce to one, and in some few cases two ounces, the best purgative which can, in almost every disease, be administered to sheep.

GENTIAN—Decidedly the best vegetable tonic in use. Dose, from one to two drachms.

GINGER—A stomachic and tonic, given with almost every aperient, in doses of from half a drachm to a drachm. It prevents griping.

IODINE.—The hydriodate of potash in the proportion of one part to

seven or eight parts, by weight, of lard, constitutes an ointment which is a powerful stimulant to the absorbent vessels, and therefore is an excellent application to glandular swellings, or to indurated tumors. It is a good application to the swelled udder *(q. v.)* in garget.

LARD—A mild and gentle purgative in doses of two ounces. The basis of most ointments, and applied externally in almost every case as an emollient and lubricant in the place of oils.

LIME, *Carbonate of*—Used as a caustic to run flocks of sheep through, in the "hoof-ail," *quem vide.*

LIME, *Chloride of*—An excellent antiseptic and disinfectant, and a good application to foul ulcers.

LINSEED-OIL—A good purgative in two ounce doses. Preferable to Epsom salts in cases of great intestinal irritation, but not otherwise.

MERCURY.—The common mercurial ointment, rubbed down with five parts of lard, for severe cases, and seven parts for ordinary cases, of scab, is an effectual cure,

MURIATIC ACID *(Spirit of Salt)*—Next to chloride of antimony, the best caustic in the worst stage of hoof-ail.

NITRATE OF POTASH *(Nitre or Saltpetre)*—In doses one drachm, a cooling diuretic.

NITRATE OF SILVER *(Lunar Caustic)*—Superior to all other caustics, but too expensive for general use. For poisonous wounds, and particularly for the bite of a mad dog, it has no substitute.

NITRIC ACID *(Aquafortis)*—Sometimes used as a substitute for chloride of antimony, or muriatic acid, as a caustic in hoof-ail. Used by drovers, also, to harden the soles of feet which have become thin and tender by driving. It is touched over the sole with a feather.

OPIUM—An invaluable sedative, and anti-spasmodic, and is employed in nearly all prescriptions for diarrhea and dysentary, and also in colic drinks. It is an important part of the "sheeps cordial." It is commonly used in the form of a tincture, or laudanum. Dose, one drachm.

PEPPER, *Black*—Given in small quantities in milk, to new-born lambs, when chilled.

PIMENTO *(Allspice)*—A substitute for ginger, in the same doses, but not so valuable.

RHUBARB—Unites the properties of a cathartic and subsequent astringent. In small doses it is a tonic and stomachic, invigorating the digestion. When the bowels are relaxed and torpid, and the stomach in a feeble state, it would seem the most appropriate purgative, when a purgative is indicated.

SALT *(Muriate of Soda)*—An ounce constitutes a purgative; in small quantities a tonic and stomachic. The necessity of keeping sheep freely supplied with salt has been referred to under Summer and Winter Management.

SULPHATE OF IRON *(Copperas, or Green Vitriol)*—Used in washes for the hoof-ail, but superseded by sulphate of copper. Internally, a tonic.

SULPHUR, *Flower of*—In doses of from one to two ounces, a good aperient. It is the basis of various ointments.

SULPHURIC ACID *(Oil of Vitriol)*—A powerful caustic, used as a substitute for the acids already alluded to, in the worst stage of hoof-ail.

Spirit of Tar—Destroys maggots, and repels the attack of flies. Flies will not approach a part over which it has been smeared.

Tar—Is a valuable application to the feet, nose, back of the horns, &c., under the various circumstances detailed in Summer Management, and in the treatment of grub in the head, hoof-ail, &c.

Tobacco—An infusion of it destroys vermin, and also is a cure for scab, *quem vide.*

Turpentine, *Spirits of*—Prevents the attack of flies, and drives away maggots. It is a useful application to old sores, wounds, &c.

Verdigris *(Acetate of Copper)*—Used in hoof-ail; but adds nothing, I think, to the good effects of the sulphate of copper.

Zinc, *Carbonate of*—Mixed with lard, constitutes a valuable emollient and healing ointment. It is mixed in the proportion of one part of the carbonate, by weight, to eight of the lard.

Mistake Corrected.—It was incidentally stated in the March Number of this Journal, that we had been informed that Mr. Gowen, of Germantown, Pa., had lately refused $500 for 500 bushels of Irish Potatoes. He assures us that our informant was mistaken, and that he would be unwilling to be considered as speculating in an article of food. We regret not getting his correction in season for the April Number, and in the mean time have apprized him of the source of our information, which was given, doubtless, under some misapprehension on the part of our informant.

Fruit-Trees, Grafting, &c.—In that valuable periodical, The Horticulturist—valuable, as might be inferred, from being conducted by Mr. Downing—there is an exceedingly impressive and interesting paper from Mr. Turner, on the subject of the vital power and longevity of fruit and timber trees, which goes far to explain facts and phenomena, that have been generally observed but not understood. We shall take an opportunity of transferring Mr. Turner's letter, with Mr. Downing's commentaries, to the pages of The Farmers' Library. For the American agriculturist who aspires to be respectably well informed in his profession, what subject more pleasing, and at the same time more necessary to be studied, than the principles of Physiology as applicable to trees which his houses and, in the greater part of the country, his fences are to be built; and from which his table is to be supplied with successive fruits, if *supplied at all!* But how many live and die on farms of hundreds of acres, enjoying less variety of fruits than is picked up in large towns, after 10 o'clock, by the scavengers of the market!

Potato-Rot—*Another Promising Experiment.*—We promised to be done with this subject until something new and promising should turn up. Such seems to be the experiment related by Senator Naill, of Maryland, a steady and zealous friend of Agriculture.

He supplied a neighbor with potatoes for planting, who carefully planted the sets from three to four inches deep, in drills about eighteen inches apart, covering them carefully with straw from three to four inches deep, except a small portion that was purposely left uncovered by way of experiment. The covering of straw prevented the growth of weeds and superseded the necessity of cultivation. The result was an excellent crop of sound potatoes, so far *as they were covered.* Those left *uncovered suffered with the rot.*

—"Had it not been for the last six words," said Mr. Skinner, "he would not have troubled the gentlemen present by reading this extract—nor, but for that, would Mr. Naill have made the communication—because it would have remained questionable whether the crop would not have been sound *without the covering!*—and this he took to be the sort of matter-of-fact practical information which New-York farmers and all other agriculturists wanted, and which it would become all Agricultural Clubs to send abroad, instead of mere generalizations."

HOUSEWIFE'S DEPARTMENT.

CATHERINE OF LIVERPOOL.

Among the many females in humble life who have been exemplary for their extraordinary perseverance under difficulties, their ingenious industry, and their self-sacrificing benevolence, a poor woman now living in an obscure situation is deserving of being placed in the foremost rank. This heroine in humble life—whom we shall describe under the name of Catherine or Kitty, by which she is usually known to her friends—was born in a populous village in Lancashire about the year 1786. Her parents, who were in poor circumstances, happened to become favorably known to an infirm and venerable lady, who kindly took Catherine home to stay with her as a humble companion and servant. By this humane lady she was taught to read, and trained not only to early habits of neatness and order, but to the knowledge as well as the practice of Christian dispositions and duties.

Although this lady had only a moderate income, she spent not a little on the poor, whom she likewise encouraged with her advice in cases of difficulty, and cheered with her presence in distress. When she became too feeble to walk to the houses of her neighbors, she was occasionally carried out in a sedan-chair, her little servant walking by her side. Catherine afterward used to describe these expeditions to her friends: "The old lady would say to me, Catherine, I am going out; and then she would be carried out in her sedan. She was too lame to walk, and could not easily get into a coach. I used to take a little basket and go by her side. We would soon stop at a cellar, into which she sent me to see how the poor woman was; and when I had come out again, she would say, How does she look? Is there any fire in the grate? Is there any coal in the house? Then she would send me for anything that was wanted. And when we had come home, she would say, Go put your feet upon the fender, and dry them, and tell me what you think of what you have seen. Then she would say, Catherine, poverty will probably be your portion; but you have one talent which you may use for the good of others. You may sometimes read half an hour to a poor sick neighbor. You may read a chapter of the Bible to her when she could not read it herself; or you may run errands for those who have no one else to go for them. Promise me, then, my child, that you will try to do what you can for others, and I hope we may meet in another world. Ah! there were few like my dear mistress."

This lady having died, her household was broken up, and Catherine returned to her family. She could not, however, be kept at home; and as no suitable place in domestic service could be obtained for her, she was sent with her brother to work at a cotton mill in a village at some distance. This was in the year 1798, when she was only twelve years of age. That a child so youthful should have been dispatched to such a scene of labor may excite surprise, but only in those who are in the habit of considering all factory systems as injurious, if not tyrannical. Many may be bad enough, but those conducted in country districts, and under good management, are, on the whole, not unfavorable to health or morals. The mill to which our young heroine and her brother were committed was one of the better regulated class. The hours were not long, and were precisely fixed. All had their appointed duty, which, if they attended to, no complaint was made. There was an open airing-ground for recreation in good weather, and a library from which books were given freely out to those who chose to read. Great care was likewise taken to prevent any impropriety of behavior. In short, nothing was wanting to render the attendance agreeable, or to encourage the diligent and orderly. In this mill Catherine passed a few years, improving in health and intelligence, though without distinguishing herself from the mass of her companions. Perhaps, however, she excelled in the propriety of her deportment, from the instructions she had received from her old mistress; and her good feelings prompted her to be grateful for the care taken of her, as well as others, at the mill. She has often been heard to say, "If ever there was a heaven upon earth, it was that apprentice-house, where we were brought up in such ignorance of evil; and where Mr. Norton, the manager of the mill, was a father to us all." It is to be wished that every one who takes the charge of a child, whether as a pupil, an apprentice, or a servant, should feel it a duty to do what may be done early, to establish the principles and practice of virtue, and to deserve such grateful recollections as those of our heroine.

Mr. Norton did not see Catherine after she quitted his establishment, and never probably was aware of the beneficial influence he had exerted on her mind; yet it was by the course of discipline and instruction in the cotton factory that her character was formed during the most susceptible and dangerous season of her life.

Catherine left the cotton mill to go to service in a family. The lady of the house was a very good manager, and a good mistress; knew what a servant's duty was, and took care that it was well done. In her family, Catherine's habits of diligence, order, and fidelity were strengthened. Everything she saw there tended to advance her education. *And is it not the true idea of education, that it comprehends all the daily and hourly influences, small as well as great, of the circumstances by which we are surrounded, and which are constantly acting upon us; bearing upon thought and feeling, and every spring of action within us? It is beginning to be understood, that whatever acts upon our powers for their growth, or decrease, or direction; whatever acts upon desire, appetite,*

or passion, to excite or to repress it, to gratify or disappoint it; and whatever, either directly or indirectly, goes to the excitement and formation of dispositions, sentiments, principles, and habits, is to be viewed as a part of education. In this view of the subject, it is not a question whether children or men shall or shall not be educated. Education is constantly going on with every individual, old and young, from the first to the last hour of life, because every individual is, in every hour and every moment, acted upon by the circumstances amid which he is placed: and because the influence of these circumstances upon him will be in accordance with the tastes and desires he is forming or has formed, the principles he is adopting or has adopted, and his strength or weakness in the application of principles to conduct. The child at home is educated far more by the examples which he sees than by the lessons which he learns; and his mind is educating with far freer and stronger tendencies in his plays and in the streets, than in school and under the eye of his master.*

Catherine was one of the most cheerful and faithful of servants. The pleasure with which she was accustomed to render any assistance to her fellow-servants was ever a matter of remark; and through this disposition, joined with a habit of accurate observation, she laid up a large stock of knowledge, which has since been invaluable to herself and others.

We have now to view Catherine in quite a new sphere of life. She was married to a person deserving of her affection, but not until she had received a promise that she should be permitted to take her mother home to live with her, for she was now old and infirm. A small house was taken and furnished, and the marriage promised every prospect of happiness. This might be called a bright gleam in Catherine's existence. When she had become the mother of two children, her husband died, and, to add to her troubles, her mother became blind and insane.

Catherine's case may now be considered to have been deplorable—a widow, the mother of two children, one a new-born infant, no means of subsistence, and with a superannuated and blind parent depending upon her. Some women in such circumstances, would have sat down and wept, pined in sorrow, or gone to the work-house. Catherine had a soul above all this.—She acutely felt the blow, but she also knew that it was a dispensation of Providence which ought to be borne. When the first emotions of distress were passed, she courageously yoked to the task of supporting her dependent family.—Catherine despised to eat the bread of idleness.

Worth never wants friends. Catherine's case excited pity among her neighbors, and her good character secured her a respectable wet-nursing. She refused to leave home for this purpose, and the baby was committed to her charge. By this means, and a trifle of wages owing to her husband, she contrived to live over a year. Now she behooved to face the world. The difficulty of obtaining work was at this time very great. There was much suffering among the operatives throughout the country, and among all who depended upon their daily labor for subsistence. The only employment of which Catherine could procure an offer was work at a nail factory, for which she was not well fitted. However, she gladly availed herself of it, because the work was paid according to the number of nails made, and she could absent herself to give a brief attendance on her mother and children. The employment was hard, and poorly paid. She generally wrought at large nails, of which she was able to make about eight hundred daily; but of the same kind some men can make double that number. Her earnings were, on an average, fifteenpence per day; yet, though small, they were still precious to her, because they were her own earnings. No one knew better than herself how to receive a favor, or how to confer one; but she would not willingly accept the means of support from another, when she could obtain them by her own industry. She has been known to work in this factory till her fingers were blistered, and she could do no more; she would then remain at home, and poultice them till they were sufficiently recovered to enable her to resume her work. She and her mother at that time often suffered from hunger. Her necessities were known to a kind friend, whose own means were small, but who yet contrived occasionally to furnish her with a good meal. Through this friend she sometimes obtained a supply of flowers or bouquets, by the sale of which she provided for her wants when she had no other means of obtaining subsistence.

In expedients like these she passed some years, during which the insanity of her mother was at times so outrageous as greatly to endanger any who had the charge of her; Yet this charge she could not relinquish. She would not hear of the removal of her parent to a place of confinement. No labors and no sufferings could weaken her filial reverence and affection. At length, however, it became necessary for her mother's own safety that she should be in the charge of those more competent to the task of restraining her, and she was removed to the work-house. But the heart of the devoted daughter was still with her; and from week to week Catherine strained every nerve, and straitened herself in every way, that she might regularly carry to her mother all the comforts she could procure. Nor were her trials those only of the early death of her husband and the long insanity of her mother. Her eldest son was a severe sufferer from his birth till the age of twenty, when he died. It is hardly to be conceived how much she did and endured for this boy. For weeks together, after a hard day's work, she was up through the whole night, kneeling by him, that he might have his arms around her neck for support, because he was unable to lie down. Her patience and love seemed to be inexhaustible, and the strength which she exerted through her afflictions almost miraculous.

The lad was a dutiful and affectionate child. He had a heart like his mother, strong both to love and to endure. For a time Catherine seemed hardly able to sustain his loss. She could not sleep, and with difficulty could take even the smallest portion of food. Her inability to sleep awakened the desire to pass her nights with the sick; but she found this recalled the memory of her son too strongly, and she did not persist in it. Desirous to fill the vacuity in her house, she now, to use her own expression, "inquired for some family who wanted a person to take care of some *tedious* children." Her sur

* These are important truths very clearly expressed, and cannot be too deeply impressed on the minds of all parents. [*Ed. Farm. Lib.*

viving child often gave her great pain. He exhibited strong indications of inheriting the insanity of his grandmother, having at times an ungovernable wildness of manner; yet, when not under excitement, he was an amiable, kind, and obedient boy.

When Catherine worked in the nail factory, she formed a friendship with another woman who also worked there. This poor creature afterward became blind and helpless. She had for some time previously been greatly disabled, and Catherine had never failed to do what she could for her. But now she took her to her own house, and for seven years supported her entirely. She carried her up-stairs at night, and brought her down in the morning. At length, when her son became so ill that she could not leave him, and her means of support were wholly unequal to the increased expense, she sent her blind friend to the work-house; yet her interest in the poor sufferer never declined.—Her care for her was like that of a mother for a child. She never omitted once a week to send her a little tea and sugar, that she might not be made uncomfortable by the want of these accustomed gratifications. It happened that this poor blind woman had a son in the work house who was a cripple, and nearly an idiot. The child was dear to his mother; and when she took her tea she gave him a part of it. This became one of his highest gratifications; and after the death of his mother, he was greatly distressed by the loss of this indulgence. Catherine, therefore, promised him that while she lived she would bring him tea and sugar, as she had brought them to his mother; and she kept her word. On one occasion a friend called upon Catherine, and found an old woman with her who had a number of small parcels in her hand. On noticing these parcels, she informed the visitor that they contained a little tea, sugar, and snuff, and that they were for a woman in the work-house nearly a hundred years old.—"She knew my parents," said Catherine, "and I dare say assisted my mother when she needed; so it is just a little acknowledgment. There are other old persons there to whom I would be glad to send something, if I had the means."

After Catherine left the nail factory, she supported her family by mangling, a benevolent gentleman in the neighborhood, who was struck with her character, having assisted her to purchase a mangle at a sale of effects. By means of it and a little charring work she lived for several years, till her mother died, when she had no longer an inducement to remain in the place; and she removed with her only surviving son to Liverpool, where she was fortunate in getting him some small employment suited to his infirmities. She took her mangle with her, and therefore we have now to follow her to one of the humblest dwellings in a back street of that large town. Here she labored, struggled to keep up a good name, and to do all the good she could do within her sphere. On one occasion a poor woman, a Mrs. O'Brien, came into the neighborhood to look for lodgings, but could nowhere obtain a room. "She must not die in the street," said Catherine. Yet what was to be done? Catherine lost no time in answering this question. The door of her house was opened, and Mrs. O'Brien and her children at once found a home there. In a fortnight this woman died; but poor as she had been, her heart was bound up in her children, and her great solicitude in death was for them. With the full sympathies of a mother, Catherine promised to do for these children as if they were her own; and this promise she has faithfully fulfilled.

Another Irish woman, Bridget M'Ann, was a common beggar. Her appearance indicated extreme distress, and no inconsiderable disease.—Yet she was unwilling to go into the infirmary, because she would there be separated from her children. Catherine visited this woman, gained her confidence, persuaded her to allow her eldest boy to be put into the work-house, and took the youngest, about two years old, under her own charge. She nursed this child carefully, sent some of her own clothes to the mother, and took a change of clothes to her every week. Yet for all these kind offices she had scarcely any other return than reproaches and complaints. The clothes, it was said, were not well washed, nor was anything done for her as it should be done. But Catherine was neither to be fatigued by service nor discouraged by ingratitude. She felt the claims of weakness, ignorance, and suffering in this poor beggar far more strongly than she felt any injury to herself. She kept the child for some months, till the mother reclaimed it; and then gave up her charge only because she was allowed to hold it no longer. It is only from such facts that one knows how much the poor often do for the poor.

After a few years' residence in Liverpool, Catherine's son died, which was a sore grief to her, for she was now alone in the world, and had no longer any one of her own family to love. To fill up the vacancy, she gladly took charge of three children from a widower, a respectable man in the neighborhood, who engaged to pay her twelve shillings per week for their board. She, however, had not long had the children under her roof, when the health of the man failed, and he was unable to earn the amount he had agreed to pay her. So anxious, however, was he to do what he could in payment for the relief and comfort he had received that he was actually at his work on the week in which he died. Catherine kindly waited upon him on his death bed, and though he professed a different form of religious belief from her own, brought him, unasked, a clergyman of his own persuasion. She said "she thought people always go fastest to Heaven on their own road." On his dying bed this poor man besought her to retain the charge of his children. She gave him her word that she would; and she admirably performed her promise. After a time the youngest boy was placed in a charity school, where she maintained a faithful supervision of him: and when he left it, she fitted him out for sea, and has still the care of him whenever he returns from a voyage. The girl she kept two or three years, till she found a good place for her. And the eldest boy, owing to the failure of the master to whom he was apprenticed, has for several years been, and still is, a considerable expense to her. He is now indeed at a trade, but he has so small wages that he is obliged to look to Catherine for much of his means of living. A fellow-apprentice earned only four shillings a week. His own father refused to keep him for so small a sum. The anxiety and grief of his mother were extreme, and she applied to Kitty upon the subject, who told the mother that on condition of the good conduct of the boy, she would receive him into her family.

At the first appearance of cholera in England, great anxiety was manifested to guard against

it, and cleanliness was especially enjoined.—The habits of the very poor, and their few conveniences, made the washing and drying of clothing and bedding very difficult Catherine's house at this time consisted of a small kitchen, a little parlor, two or three chambers, and a small yard at the back of the house. In the kitchen she had a copper. She fastened ropes across the yard, and offered her poor neighbors the free use of them and her kitchen for washing and drying their clothes. She also took charge of clothes and bedding which were lent for the use of the poor. So apparent was the benefit derived by the families who availed themselves of Catherine's kindness, that a benevolent society was led to provide a common cellar where families might wash every week.

The establishment thus begun has been found so useful that it is still maintained. In cases of cholera fever, medical men are accustomed to send a note with the clothes used by a patient, or when a change of linen is required; hired washers being employed for the service of the sick. This plan made neighbors willing to lend clothes and bedding, since no risk of contagion was incurred. During the second year of the cholera, one hundred and forty dozen clothes for men and women, one hundred and fifty-eight sheets, thirty-four beds, sixty quilts, and one hundred blankets,were washed in this establishment in one week.

The cholera principally attacked the heads of families, especially those who were in a state of exhaustion from fatigue or want of food. It frequently happened that the sufferers had neither food nor fuel, while the rigorous quarantine led to a dearth of employment. Catherine divided her own stores as far as she could with the sufferers around her. A supply of oatmeal was given her, and with this she made porridge every morning for a number who would otherwise probably have had no breakfast; and at one time she thus supplied sixty with daily food. A neighbor every evening went three miles into the country for the milk for this porridge.

Wherever the disease appeared among those who knew Catherine, her presence and aid were felt to be of high importauce. The physicians were quite unable to meet the calls that were made upon them. She therefore went to them for advice, administered the remedies which were prescribed, and carried back her accounts of her patients. It seemed impossible that she should obtain rest either night or day. She found a vacant room, on the floor o: which she could spread some bedding, and there she provided a lodging for families in which death had occurred. and whose rooms, it was thought, should be vacated for a time, that they might be purified. One of the first cases of cholera occurred in the street where Catherine lived.—A widower, with two young children, boarding with a poor woman, was taken suddenly ill, and died. To prevent unnecessary exposure to the disease, the attending physician directed that the body should be buried unwashed. A report of this got abroad, and a crowd assembled about the house, threatening violence if the body were not washed before it was buried. Catherine undertook to address the assemblage —"We should be very sorry to do anything wrong," she said to them, "but the physician has forbidden that the body should be washed, on account of the danger of infection. Now, this man who has died is no more to us than he is to any of you. Mrs. R——— and I have done our part by laying out the body; and if any one of you will come in and wash it, we will provide everything that is necessary for you." The crowd dispersed quietly and quickly, and the body was buried unwashed.

The deaths and sickness of so many parents by cholera left a large number of destitute children, too young to go to school, and who were therefore running about the streets. Catherine could not overlook these children. She collected about twenty of them into her house, and a neighbor, who lived on the opposite side of the street, offered to assist her in the care of them. This neighbor amused the children by singing to them, by telling them stories, and by teaching them to repeat hymns. The number of the children soon became too large to be comfortably accommodated in Catherine's little dwelling. It was resolved, therefore, to form them into a scoool. The infant school thus begun was adopted by the managers of one for older children in the same street; the neighbor who aided Catherine became the mistress. and obtained a comfortable maintenance from the employment she had begun in benevolence.

A being with such a universal spirit of charity and love, and with such self-imposed claims and duties, required to eke out her means by every plan which seemed available. To make the most of her house, small as it was, she received lodgers, and to make their evenings pass agreeably, she borrowed books and newspapers, and proposed that one should read aloud for the general entertainment. She provided a good fire in the winter, well knowing this comfort often tempts even a sober man to an alehouse. She permitted her lodgers to invite their acquaintance; and during the winter of 1835, as many as ten met and subscribed for three different cheap periodicals, and to the Mechanics' Library. As some of the party were carpenters' apprentices, an older workman gave them instruction in their business before their reading began. One of these young men begged Catherine to speak to four of their fellow-workmen, who spent the money at alehouses which they earned by working over-hours. She did so, telling them if they would come every night to her house, they should have the use of a good fire and a newspaper, and for sixpence a week she would provide a supper.

This poor woman seems to have had an eye to everything. One day, in passing a shop, she saw a great boxfull of waste paper, including many damaged and used Bibles. These she was allowed to pick out and buy for a mere trifle. When she brought her parcel of Bibles home, she fastened the leaves, patched up the covers, and then lent them to sailors who were going to sea. It was afterward ascertained that by this act the characters of several were improved. It may be matter for surprise how Catherine earned enough to accomplish so many good deeds. But cheerful and persevering labor, with rigorous economy, will do wonders. She still lives, and is a credit to her station, showing, in all her undertakings, a remarkable power of making much of slender means. Her economy with regard to both food and clothing is admirable.—Nothing is wasted. She has been known to stew fish-bones into broth for the sick poor, and from the refuse of fruit to make a pleasant drink for fever patients. Time is also, in her estimation, a thing not to be thrown away, and therefore every moment of her waking existence is devoted to the execution of some useful object.

The owner of the house in which Catherine lives is a single lady, and a cripple, with a very

small income. Catherine's consideration of these circumstances is beyond all praise. She expresses her unwillingness to apply to her poor landlady even for necessary repairs, and as far as possible has made those repairs herself. She buys paint, and paints her rooms with her own hand. She receives payment from her lodgers on Friday, and the sum, though only a few shillings altogether, she lends to some poor women who purchase certain goods which they sell in the market on Saturday, and make their returns to her on Saturday night. It does not appear that she has ever thus lost anything, while the gain has been of considerable importance to those who have made it. She has mixed but little with her neighbors, except for such offices of kindness as she could render to them; and most unwillingly asks for any aid for her own personal friends.

We must, however, draw our account of this poor widow to a conclusion. She is not without faults; as, for instance, hastiness of temper; but her anger is soon appeased, and no ill usage can check her kindness, except for a very short time. She has experienced injustice; and though she has felt it strongly, has acknowledged that it was a duty to forgive others, when there is so much to be forgiven in ourselves. She was ever most careful not to incur a debt, maintaining her sense of duty on this subject with an energy worthy of all praise. Had she been embarrassed by debt, she could have carried through few of her benevolent intentions. Her whole history presents a striking combination of simplicity with energy, sensibility with forethought, calculation, and economy, with disinterestedness and self-sacrificing benevolence. To a pious reliance on Providence she unites a vigilant sense of practical duty, an indifference to all selfish considerations, and a strong faith in her fellow-creatures, in herself, in good principles, and in TRUTH.

PRICES CURRENT.

[*Corrected, April 26, for the Monthly Journal of Agriculture.*]

ASHES—Pots, 1st sort, '47-8	℔ 100 lb	6	—	@	—	—
Pearls, 1st sort, '47-8		7	75	@	7	87½
BEESWAX—American Yellow		—	20	@	—	22
CANDLES—Mould, Tallow..	℔ lb.	—	11	@	—	13
Sperm		—	31	@	—	32
COTTON—From	℔ lb.	—	5½	@	—	7½
COTTON BAGGING—Kentucky		—	15½	@	—	16
CORDAGE—American	℔ lb.	—	11	@	—	12
DOMESTIC GOODS—Shirtings,	℔ y.	—	4½	@	—	9
Sheetings		—	6	@	—	15
FEATHERS—American, live		—	35	@	—	37½
FLAX—American		—	9½	@	—	—
FLOUR & MEAL—Genesee, pure, bbl.		6	37½	@	—	43¾
Genesee, from Western Wheat		6	12½	@	6	25
Troy		6	—	@	6	25
Oswego		6	06½	@	6	18¾
Michigan		6	25	@	—	31½
Ohio		—	—	@	6	25
Brooklyn and New-York		6	—	@	6	18¾
Brandywine		—	—	@	—	—
Georgetown		6	12½	@	6	25
Baltimore, Howard-street		6	12½	@	—	—
Richmond City Mills		—	—	@	—	—
Richmond Country		—	—	@	6	12½
Alexandria		—	—	@	6	12½
Fredericksburg and Petersburg		—	—	@	—	—
Rye Flour		3	50	@	3	75
Corn Meal, Western and State		2	25	@	—	—
Corn Meal, Jersey		2	37½	@	—	—
GRAIN—Wheat, White	℔ bush.	1	35	@	1	40
Wheat, Red and mixed		1	30	@	1	35
Rye, Northern		—	73	@	—	—
Corn, Jersey and Northern yel		—	52½	@	—	53
Corn, Southern, yellow		—	53	@	—	—
Corn, Western, flat yellow		—	—	@	—	—
Oats, Northern		—	44	@	—	47
Oats, Jersey		—	40	@	—	42
HAY—North River in bales,	℔ 100 lb	—	50	@	—	60
HEMP—American, dew-rotted..	ton	135	—	@	140	—
" " water-rotted		160	—	@	190	—
HOPS—1847		—	6	@	—	7
IRON—American Pig, No 1		30	—	@	—	—
" Common		26	—	@	27	50
LIME—Thomaston	℔ bbl.	—	75	@	—	77
LUMBER—Boards, N.R.,	℔ M. ft. clr.	35	—	@	40	—
Boards, Albany Pine	℔ pce.	—	10	@	—	19
Plank, Georgia Y. Pine.	℔ M. ft.	27	50	@	30	—
Staves, White Oak, pipe,	℔ M.	60	—	@	—	—
Staves, White Oak, hhd		45	—	@	—	—
Staves, White Oak, bbl		33	—	@	35	—
Staves, Red Oak, hhd		28	—	@	32	—
Hoops		27	—	@	32	—
Scantling, Eastern		17	50	@	20	—
Scantling, Oak		30	—	@	35	—
Timber, Oak	℔ cubic foot	—	22	@	—	25
Timber, White Pine		—	18	@	—	22
Timber, Georgia Yellow Pine		—	30	@	—	35
Shingles	℔ bunch	2	50	@	2	75
Shingles, Cedar, 3 feet, 1st quality.		28	—	@	34	—
Shingles, Cedar, 3 feet, 2d quality.		27	—	@	32	50
Shingles, Cedar, 2 feet, 1st quality.		20	—	@	25	—
Shingles, Cedar, 2 feet, 2d quality.		18	—	@	22	—
Shingles, Cypress, 2 feet		18	—	@	22	—
Shingles, Company		35	—	@	38	—
NAILS—Wrought, 6d to 20d	℔ lb.	—	8	@	—	13
Cut 4d to 40d		—	4	@	—	4½
PLASTER PARIS—	℔ ton	2	50	@	—	—
PROVISIONS—Beef, Mess,	℔ bbl.	7	62½	@	8	75
Beef, Prime,		4	62½	@	5	62½
Pork, Mess, Ohio		9	87½	@	10	—
Pork, Mess, Ohio, new		—	—	@	—	—
Pork, Prime, Ohio		8	25	@	8	37½
Pork, Prime, Ohio, new		—	—	@	—	—
Lard, Ohio, prime	℔ lb.	—	6¾	@	—	7¾
Hams, Pickled		—	5½	@	—	6
Hams, Smoked		—	6½	@	—	7½
Shoulders, Pickled		—	3¾	@	—	4
Beef Hams in Pickle		12	—	@	12	50
Beef, Smoked	℔ lb.	—	8	@	—	—
Butter, Orange County Dairy		—	23	@	—	27
Butter, Western Dairy		—	18	@	—	20
Cheese		—	7½	@	—	8½
SEEDS—Clover, new	℔ lb.	—	6½	@	—	7
Timothy	℔ tierce	20	—	@	25	—
Flax, Rough, in bulk	bush	1	30	@	1	33
SOAP—New-York	℔ lb.	—	4	@	—	7
TALLOW—American Rendered		—	8½	@	—	9
TOBACCO—Virginia	@ lb.	—	3½	@	—	7
Kentucky and Missouri		—	4	@	—	8½
WOOL, Am. Saxony, Fleece,	℔ lb.	—	40	@	—	45
American Full Blood Merino		—	35	@	—	38
American ½ and ¾ Merino		—	31	@	—	33
American Native and ¼ Merino		—	27	@	—	30
Superfine, Pulled, Country		—	29	@	—	30